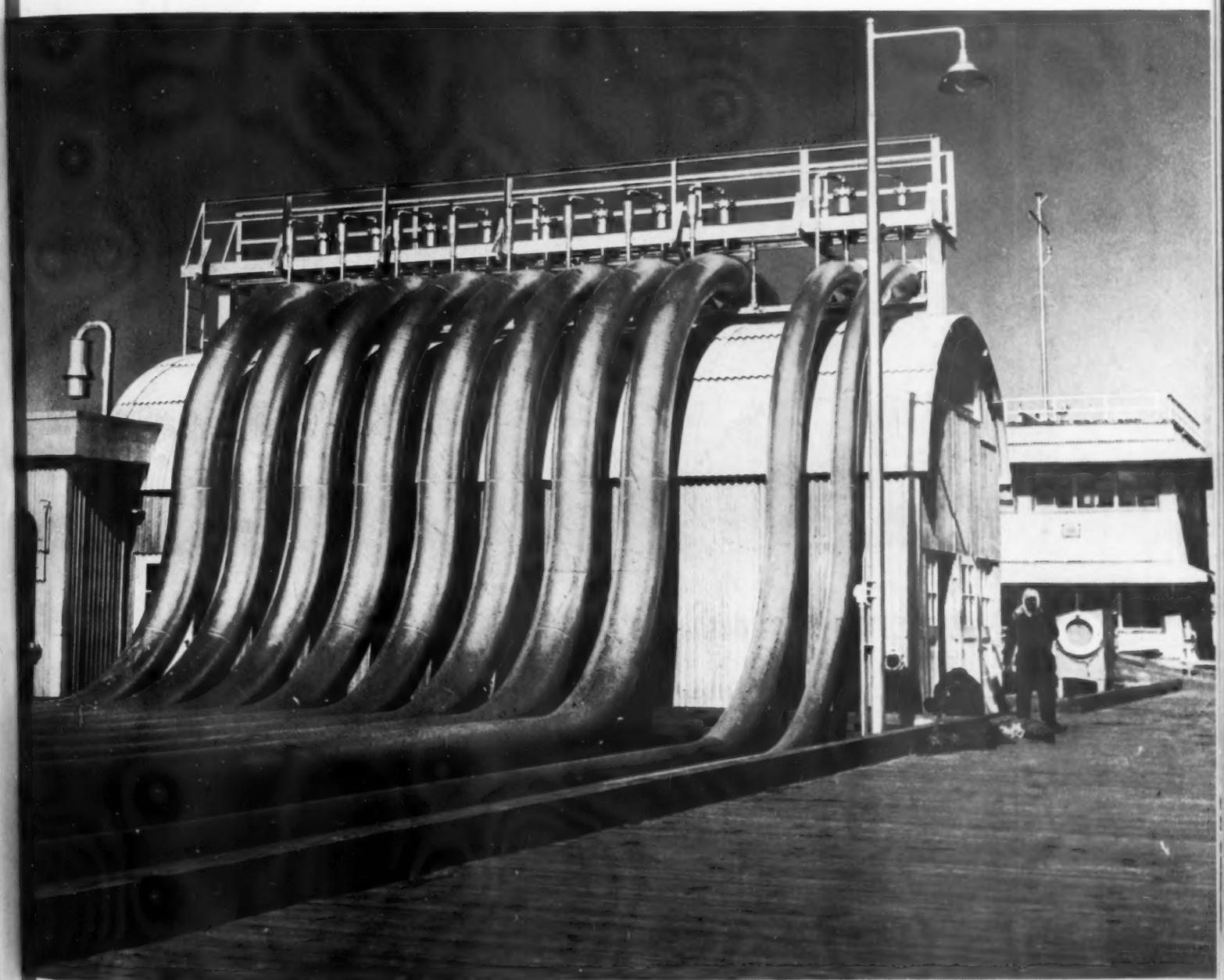
World Petroleum



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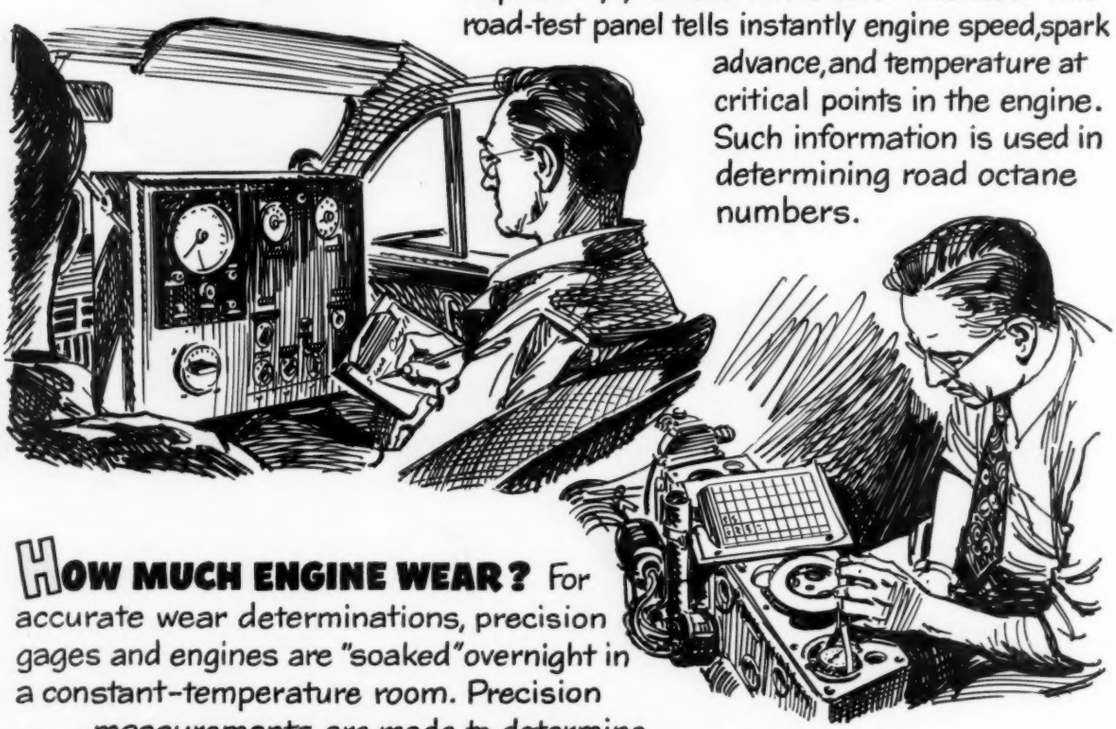
OCTOBER, 1950

Speaking of Research... by ETHYL

POWERFUL STUFF. One-half teaspoonful (2.5cc) of tetraethyllead will raise a gallon of gasoline 10 octane numbers (Research method). This figure is an average based on recent tests of 20 premium base gasoline.

WHAT OCTANE NUMBER gasoline is required by your customers' cars? This electronic road-test panel tells instantly engine speed, spark advance, and temperature at critical points in the engine. Such information is used in determining road octane numbers.



HOW MUCH ENGINE WEAR? For accurate wear determinations, precision gages and engines are "soaked" overnight in a constant-temperature room. Precision measurements are made to determine the effect of fuel and lubricant combinations on engine wear. To achieve longer, trouble-free engine operation is Ethyl's aim.

Over 400 specialists working full time on fuel and engine developments

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"Newallastic" bolts and studs have qualities which are absolutely unique. They have been tested by every known device, and have been proved to be stronger and more resistant to fatigue than bolts or studs made by the usual method.

C. P. Newall & Co., Ltd.

POSSILPARK GLASGOW · N

Dependable Selectivity...

Efficient H_2S removal in the presence of CO_2

Dependable, low-cost removal of H_2S in the presence of large volumes of CO_2 is a primary advantage of the Shell Phosphate Process. All but harmless amounts of H_2S are removed while most of the CO_2 is left untouched.

Important too is the fact that the treating process has no harmful effect upon subsequent processing operations. The treating agent is inorganic . . . non-contaminating to hydrocarbons.

Low operating costs are the rule with the Shell Phosphate Process. Since a minimum of CO_2 is removed, steam regeneration of the treating solution costs less. Also, because the regenerated H_2S is in a relatively high concentration, the cost of conversion to solid sulphur or sulphuric acid is greatly reduced.

The Shell Phosphate Process is available to any operator under license from the Shell Development Company . . . together with experienced engineering service for its design, installation, and operation.

SHELL

SHELL DEVELOPMENT COMPANY

50 West 50th Street, New York 20, N. Y.

WORLD PETROLEUM for October, 1950. Vol. 21, No. 11, October, 1950. WORLD PETROLEUM is published monthly by Mona Palmer, Trustee under the will of Russell Palmer, 2 W. 45th St., New York 19, N. Y. Acceptance at East Stroudsburg, Pa., under Section 34.64 P. L. & R. Authorized. Subscription rate: $5.00 per year, single copies 50c.

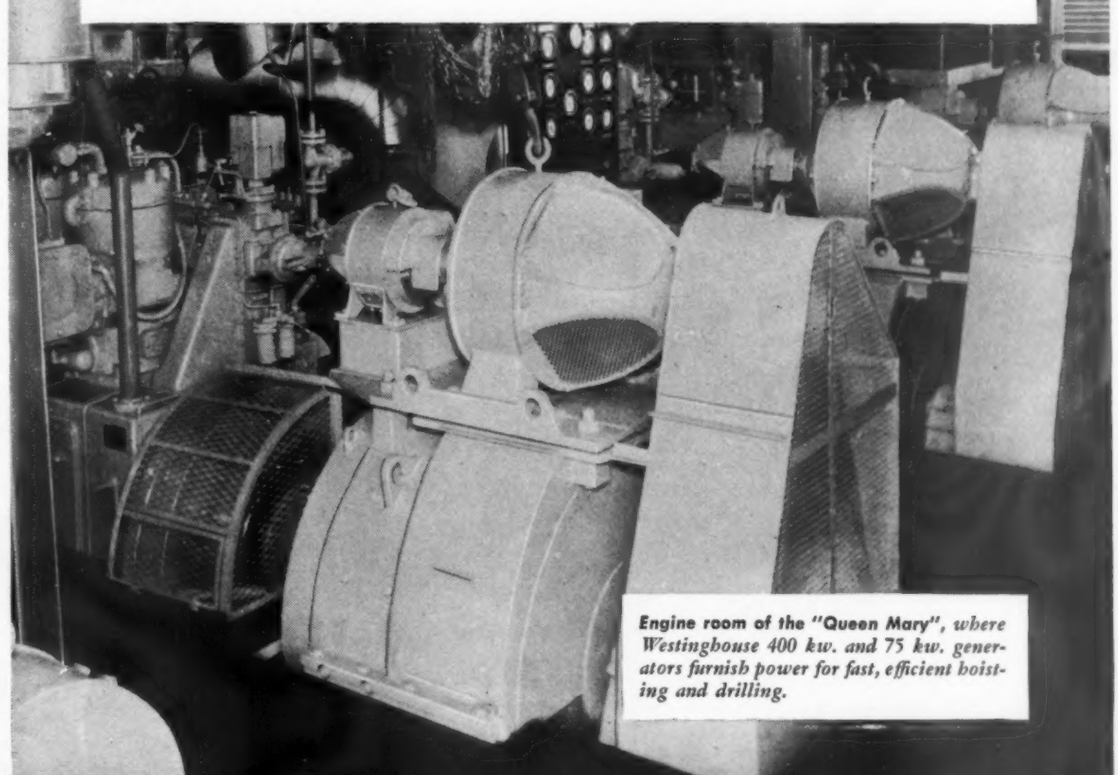
"WE STRUCK OIL with the 'QUEEN MARY'

. . . nearly a thousand fathoms deep!"

"When you're in the crew of Creole Petroleum's No. 2142 out on Lake Maracaibo, in Venezuela, you're working aboard the biggest ocean-going rig afloat designed specifically for electric drilling operations. We call her the "Queen Mary" because she's powerful enough to do a big job *fast*. She can sink a well 15,000 to 20,000 feet deep . . . there's plenty of electric power aboard. We struck oil on our trial run."

The "Queen Mary's" 1,500-kilowatt electrical system—designed and equipped by Westinghouse—gives it more economy, speed and freedom of action than any other type of drive, because all of the power equipment can be mounted directly on the barge, ready for instant action at any drilling site. With electric power, even storms don't disrupt operations for long—it's so easy and safe to connect and disconnect the power cables.

In oil and in other industries, properly selected and applied electrical equipment can step up efficiency and cut costs. Whatever the size or nature of your production problem, Westinghouse engineers will be glad to help you obtain the apparatus to meet your specific needs.

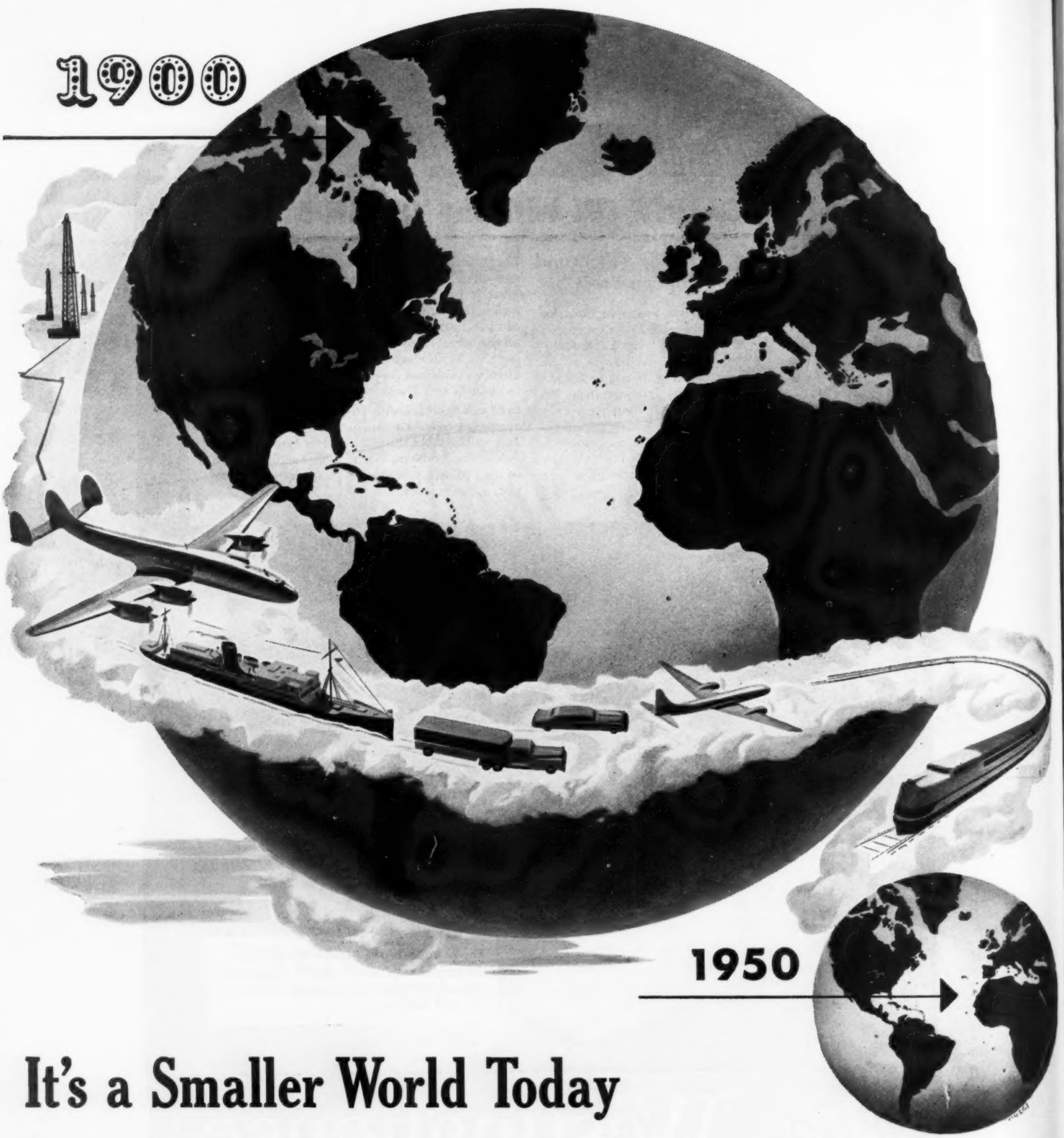


Engine room of the "Queen Mary", where Westinghouse 400 kw. and 75 kw. generators furnish power for fast, efficient hoisting and drilling.

Westinghouse

WESTINGHOUSE ELECTRIC INTERNATIONAL COMPANY

40 Wall Street, New York 5, U. S. A.



It's a Smaller World Today

Fifty years ago it took over two months to go around the world by the fastest means available. But recently a journalist made the trip in nine days, with time for 400 interviews en route! This shows how the world has grown steadily smaller as transportation by land, sea and air has progressed. Peoples far removed from each other are more easily able to visit back and forth—to exchange goods and services. No longer are the oceans barriers between continents.

Crossing an ocean today takes only a few hours by airplane, a few days by ship. Highways have brought nations closer together. This is a remarkable change in the short space of half a century. It has been made possible largely by the internal combustion engine, fueled and lubricated by petroleum products. We are proud to have had an important part in these developments. *Petroleum helps to build a better life.*

The better you live,

the more oil you use...

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BYRON JACKSON IN THE STERLING AREA

HAYWARD TYLER

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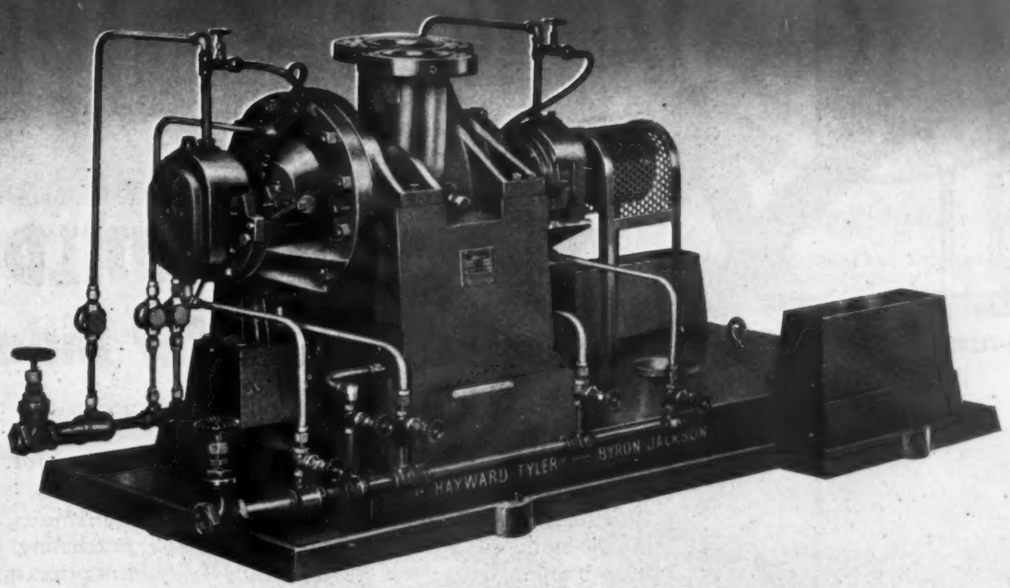

THE high, world-wide reputation enjoyed by B. J. Pumps is maintained in the sterling area by Hayward Tyler and Co. Ltd. of Luton, England, British licensees for the manufacture of Byron Jackson Centrifugal Pumps.

Pump manufacturers for a century and a half, Hayward Tyler have long practical experience and modern "know how." The combination of these two famous names guarantees to the Oil Industry in all parts of the world products of the very highest quality and craftsmanship. Please send enquiries for sterling purchases to the following address.

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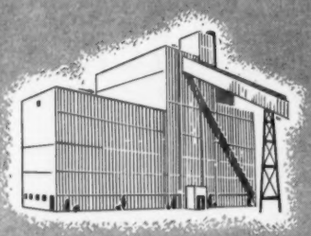
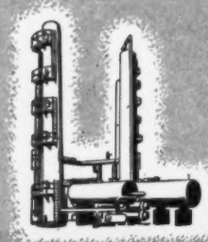
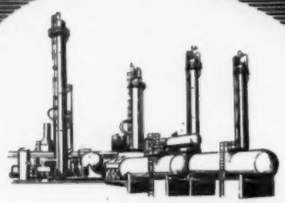


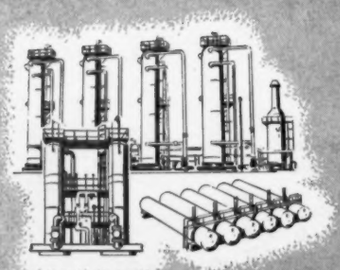
POWER DIVISION



CHEMICAL DIVISION



PETROLEUM DIVISION



NATURAL GAS DIVISION

This Natural Gas Dehydration and Gasoline Recovery Plant with a capacity of 140,000,000 SCF per day Natural Gas Dehydration, 90,000,000 SCF per day Natural Gasoline Recovery, and 110,000 gallons per day total products is typical of Pritchard's design engineering and construction for the Oil and Gas Industries.

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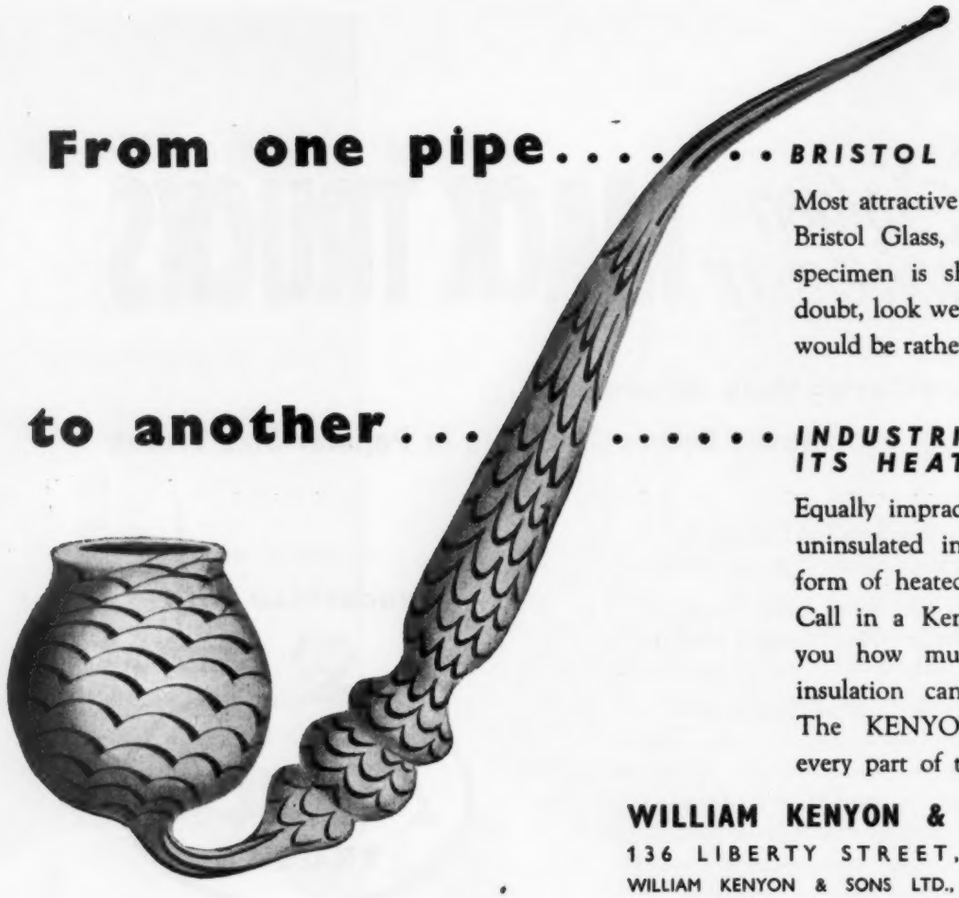
From one pipe.... to another...



from "The Pipe Book"
by Alfred Dunhill

BRISTOL GLASS PIPE

Most attractive are the coloured pipes of old Bristol Glass, of which an unusually fine specimen is shown here. This would, no doubt, look well in a collector's cabinet—but would be rather impractical for every-day use.

INDUSTRIAL PIPING AND ITS HEAT INSULATION

Equally impractical in modern plants is the uninsulated industrial pipe conveying any form of heated fluid.

Call in a Kenyon engineer—he will show you how much KENYON planned heat insulation can save for you year-by-year. The KENYON organisation operates in every part of the world.

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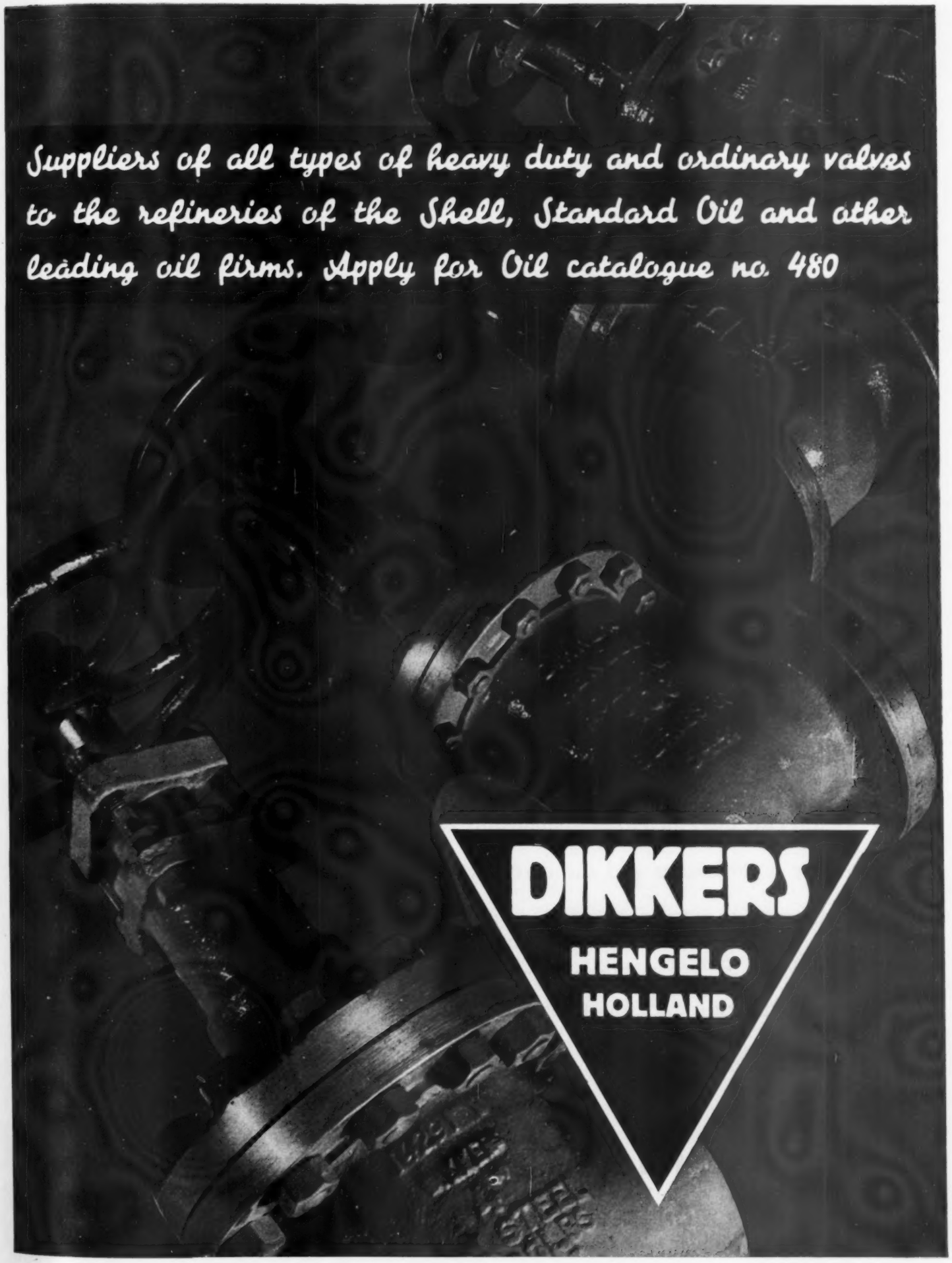
WILLIAM KENYON & SONS LTD., DUKINFIELD, CHESHIRE, ENGLAND

KENYON *Planned* HEAT INSULATION


Suppliers of all types of heavy duty and ordinary valves to the refineries of the Shell, Standard Oil and other leading oil firms. Apply for Oil catalogue no. 480
DIKKERS
HENGELO
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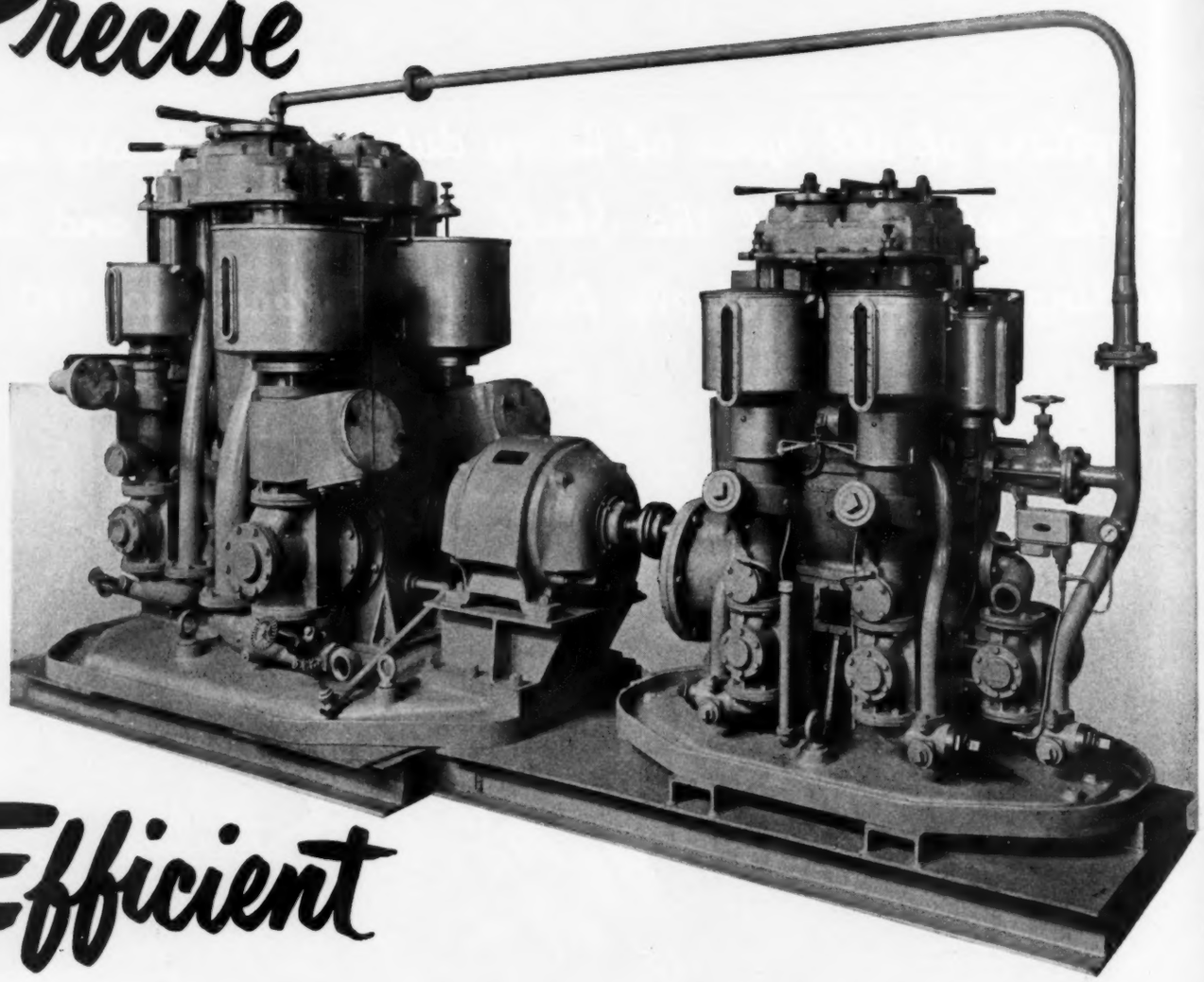

Efficient

The oil blending machines shown here are examples of the precise and efficient craftsmanship available at Sun Ship. The versatility of our organization and the diversity of our facilities enable us to build with equal success other refinery equipment, chemical plant and industrial machinery; tankers, cargo and passenger vessels. Here, too, are facilities for dry docking and for making all kinds of marine repairs.

Sun

SHIPBUILDING & DRY DOCK COMPANY

SINCE 1916

ON THE DELAWARE • CHESTER, PA.

25 BROADWAY • NEW YORK CITY

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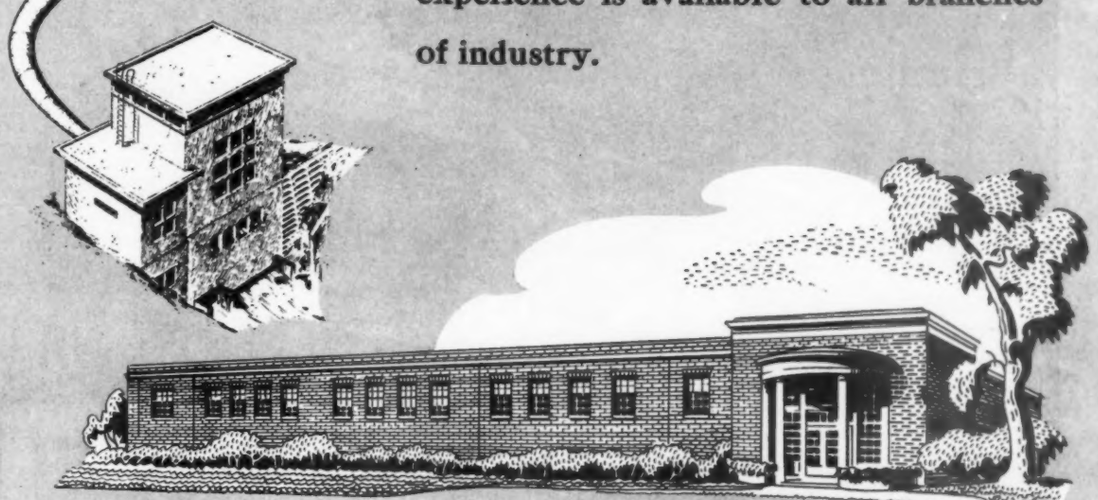
Our work includes engineering and construction for varying projects, large and small. Each receives the same technical skill and attention. Our broad experience is available to all branches of industry.



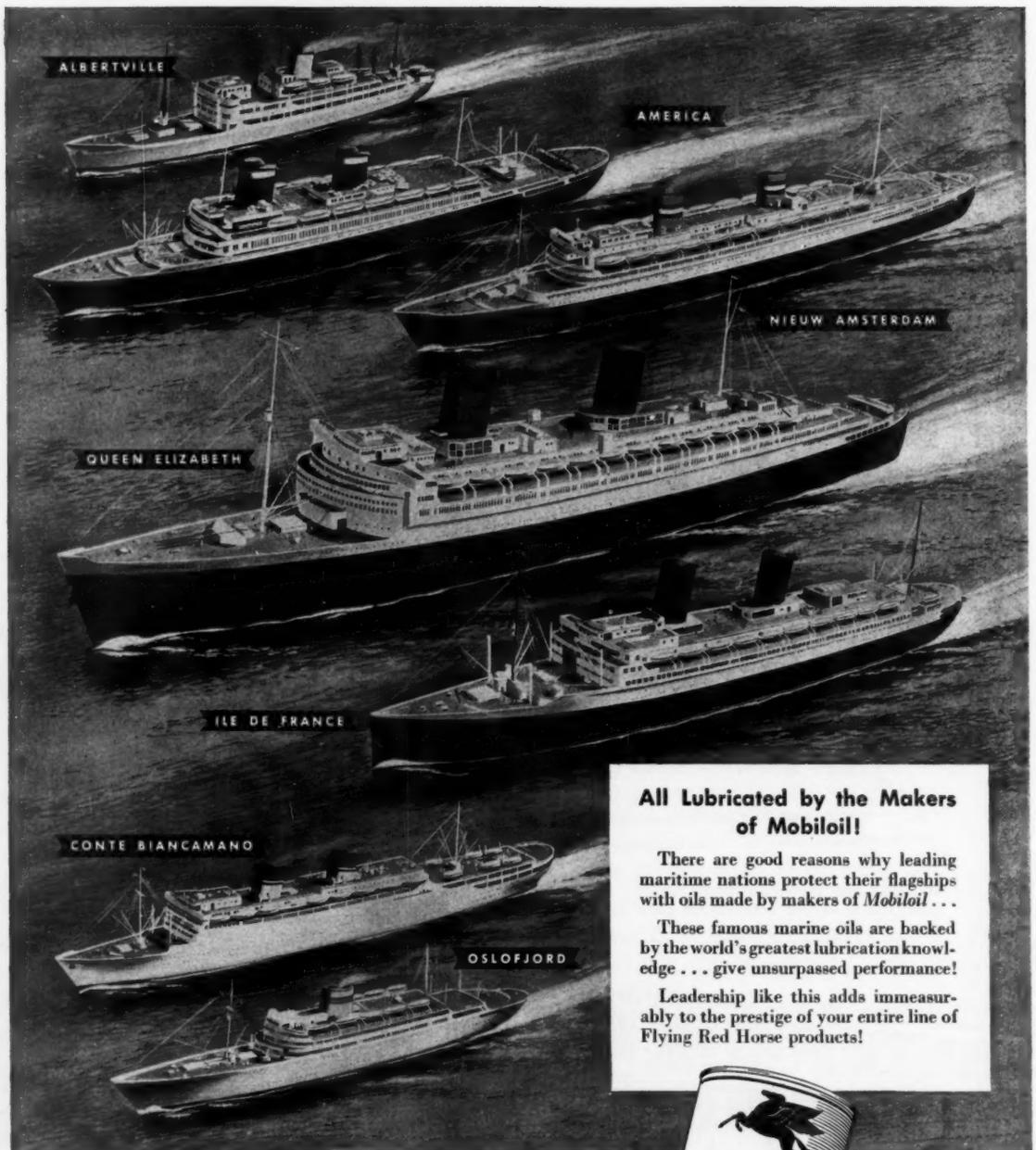
This Service Building for Alexandria and Arlington Area, designed and constructed for Virginia Electric and Power Company, houses offices for outside departments and general storerooms.

Manufacturing Building at Watertown, Massachusetts designed and constructed for The Prudential Insurance Company for occupancy by Manning, Maxwell & Moore, Inc. The total floor area is 136,000 sq. ft.

STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY OF STONE & WEBSTER, INC.

First With the Flagships



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There are good reasons why leading maritime nations protect their flagships with oils made by makers of *Mobiloil* . . .

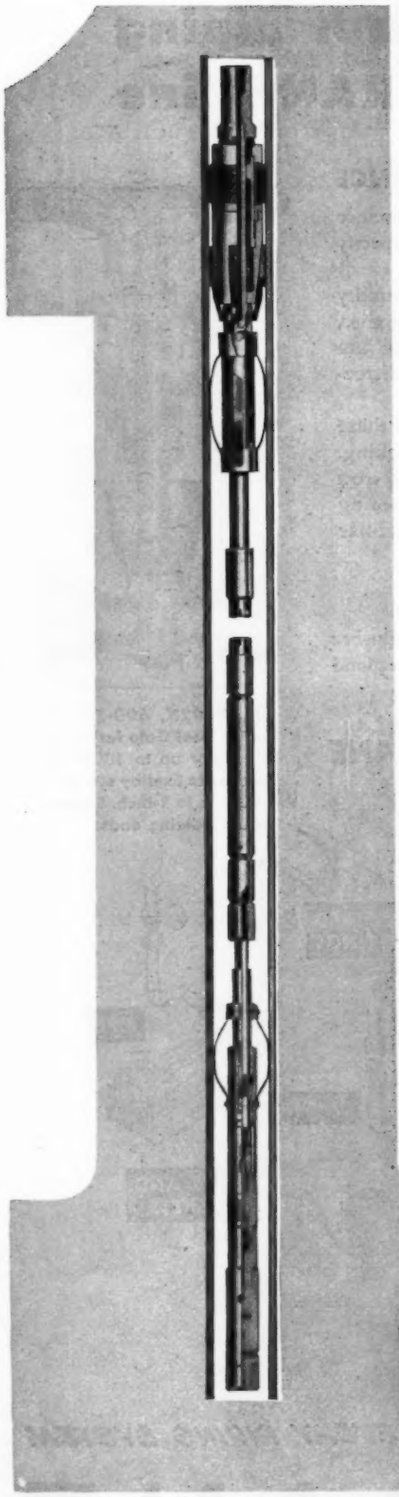
These famous marine oils are backed by the world's greatest lubrication knowledge . . . give unsurpassed performance!

Leadership like this adds immeasurably to the prestige of your entire line of Flying Red Horse products!

Now More than Ever—it Pays to Sell the World's Best Seller!

Mobiloil

SOCONY-VACUUM OIL CO., INC., and Affiliates: MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP.



PERFORATE and TEST to secure water shut-off information - - do exploration - - or actual production work in one trip.

1 trip

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JOHNSTON FORMATION AND CASING TESTING

The combination of the Johnston "Shoot-N-Test" Gun Perforator and the Johnston Formation Tester

- **Saves wear and tear on equipment**
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For a bigger choice of better piping Choose from the broad CRANE line

LOW IN PRICE . . . HIGH IN PERFORMANCE

Need small steel valves you can count on for quality performance . . . yet are low in initial and maintenance costs? Then specify these Crane 600-Pound Union Bonnet Small Steel Gates.

They're strong—body, bonnet, and yoke are high quality Crane carbon steel. And they're easy to operate. Wedge disc, closely guided throughout travel, does not get out of line or jam in body. Non-rigid disc-stem connection prevents stem distortion and binding of parts.

Want maximum protection against leakage? Then note these features: Stuffing box—deep and filled with high-quality packing. Bonnet joint—male and female design, fitted with soft iron gasket. Body seat rings—securely rolled-in to prevent loosening in service. See your No. 49 Crane Catalog, or send for Circular AD-1741.

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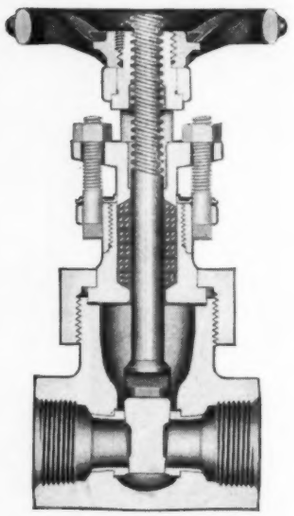
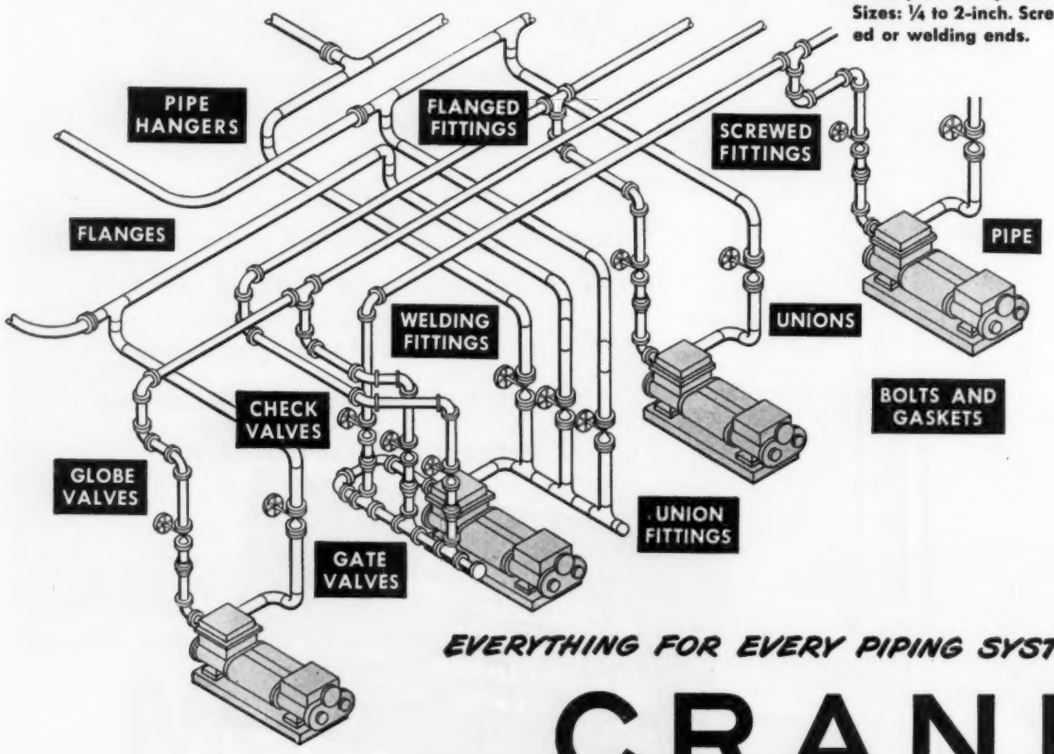


No. 3602X, 600-Pound Small Steel Gate for oil or oil vapor up to 1000° F. Exelloy to Exelloy seating. Sizes: ¼ to 2-inch. Screwed or welding ends.

● ***DISTILLATION PUMP ROOM PIPING, FOR EXAMPLE, CAN BE COMPLETELY EQUIPPED ON ONE ORDER TO CRANE***



EVERYTHING FOR EVERY PIPING SYSTEM

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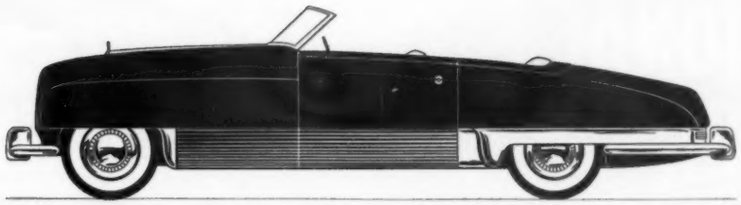
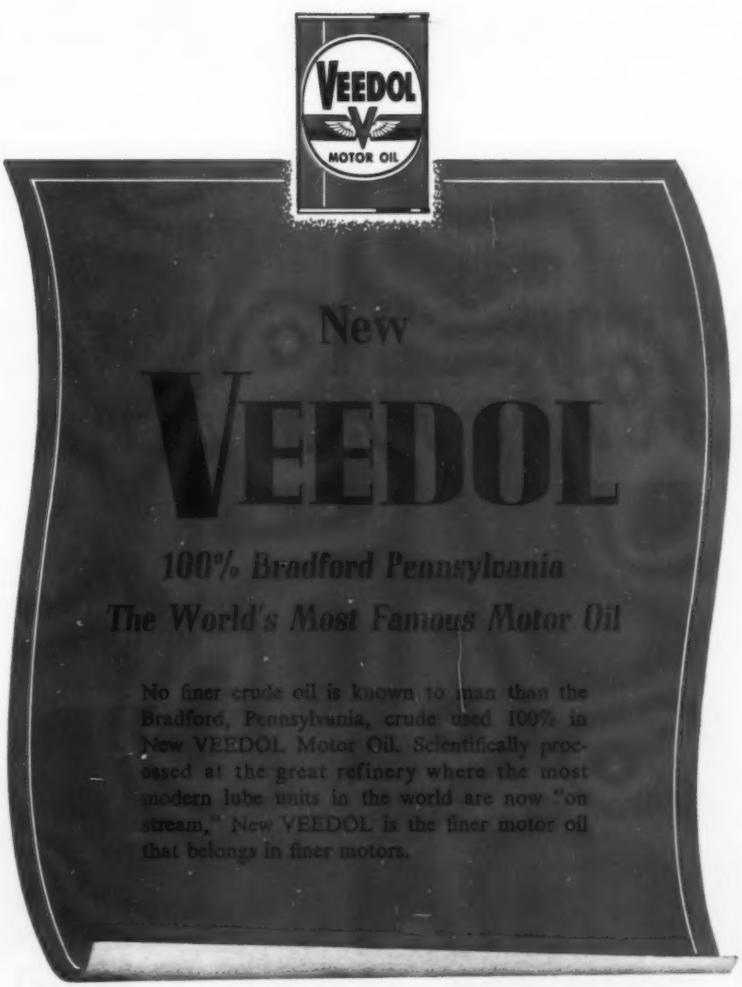
VALVES • FITTINGS • PIPE • PLUMBING AND HEATING



Custom Convertible Designed by Brooks Stevens, Industrial Designer

Found
Wherever Fine Cars
Travel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100% Bradford Pennsylvania
The World's Most Famous Motor Oil
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DANBOLINE SILVERETTE
A special anti-corrosive paint which successfully protects exteriors of Rail and Road Tanks, Oil-field Plant etc.

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A pigmented solution of a synthetic resin which is insoluble in petroleum products, benzol and coal tar derivatives. Protects interiors of transport tanks and refinery plant from corrosion.

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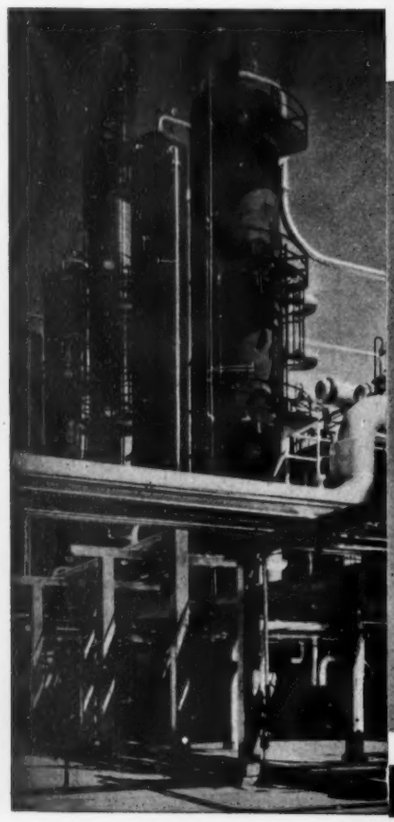

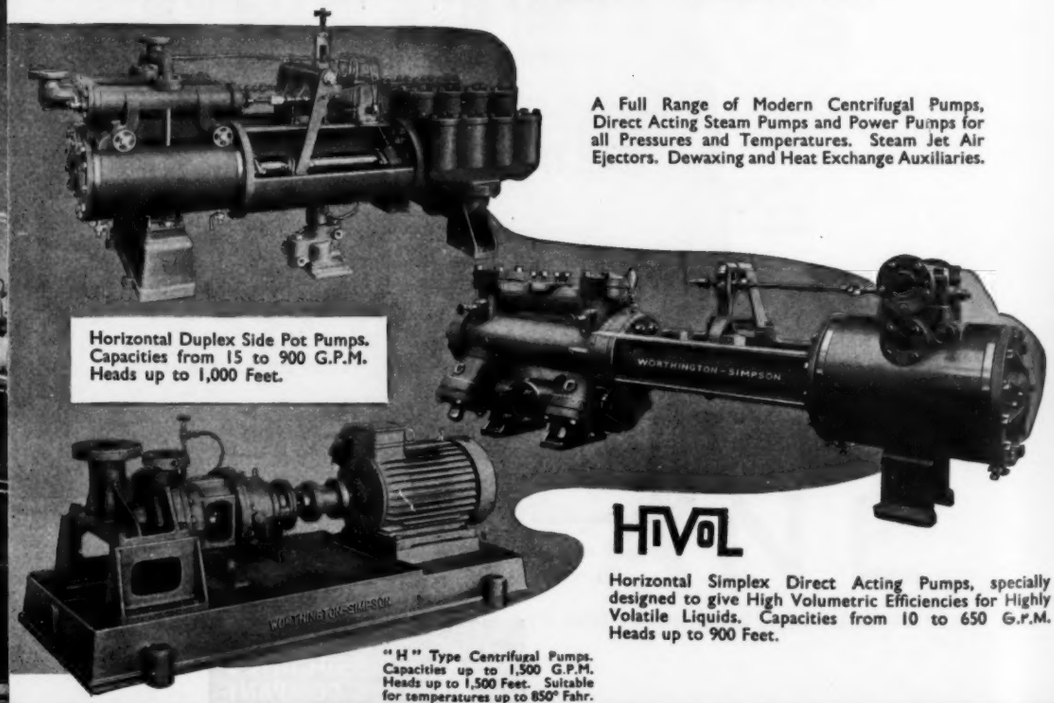

A Full Range of Modern Centrifugal Pumps, Direct Acting Steam Pumps and Power Pumps for all Pressures and Temperatures. Steam Jet Air Ejectors. Dewaxing and Heat Exchange Auxiliaries.

Horizontal Duplex Side Pot Pumps. Capacities from 15 to 900 G.P.M. Heads up to 1,000 Feet.

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Horizontal Simplex Direct Acting Pumps, specially designed to give High Volumetric Efficiencies for Highly Volatile Liquids. Capacities from 10 to 650 G.P.M. Heads up to 900 Feet.

"H" Type Centrifugal Pumps. Capacities up to 1,500 G.P.M. Heads up to 1,500 Feet. Suitable for temperatures up to 850° Fahr.

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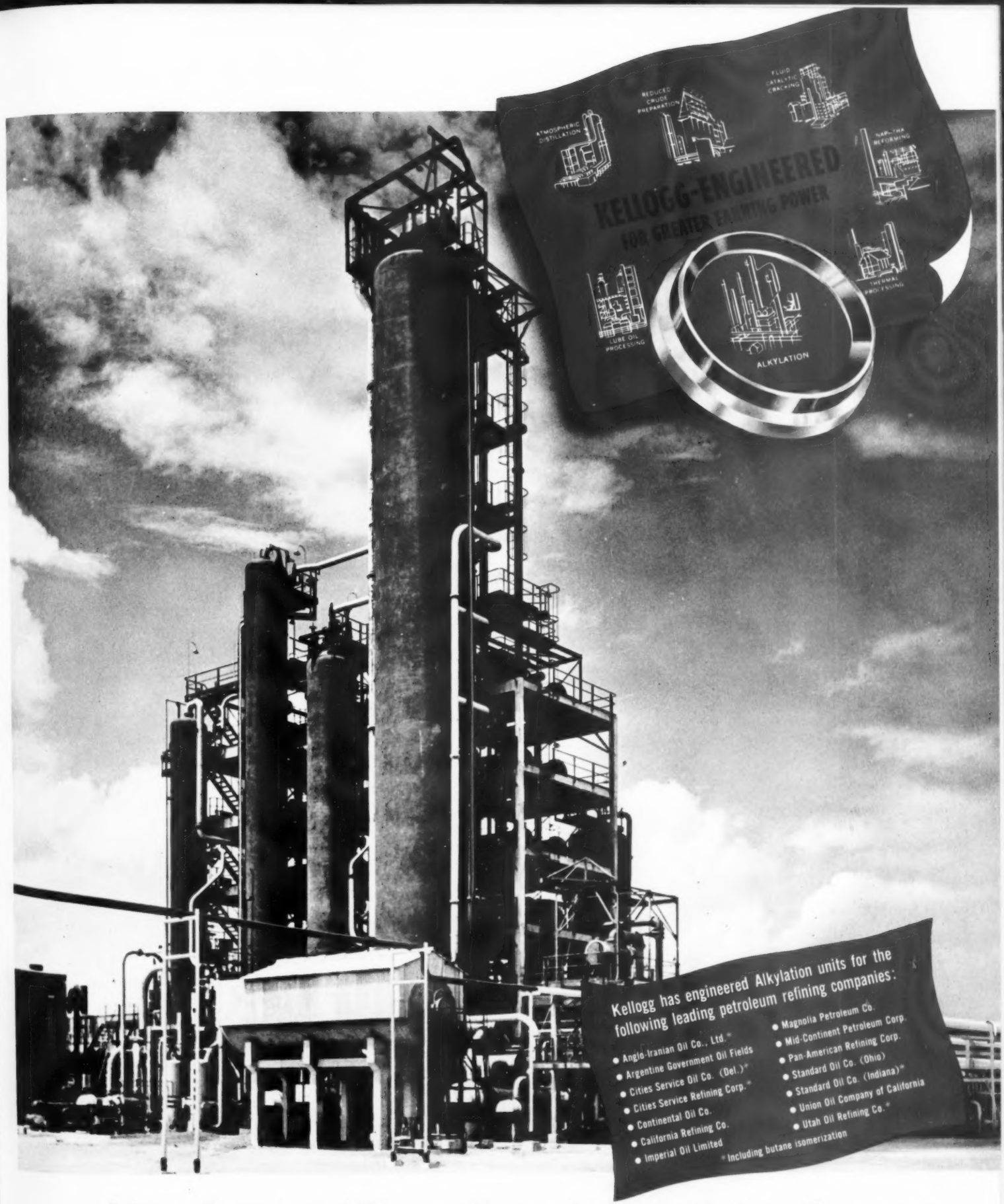
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Kellogg has engineered Alkylation units for the following leading petroleum refining companies:
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• Magnolia Petroleum Co.
• Mid-Continent Petroleum Corp.
• Pan-American Refining Corp.
• Standard Oil Co. (Ohio)
• Standard Oil Co. (Indiana)*
• Union Oil Company of California
• Utah Oil Refining Co.*
*Including butane isomerization

More than 1½ million gallons of 90+ alkylate flow every 24 hours from Kellogg-engineered Alkylation units!

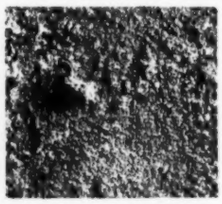
Yes! Kellogg-built Alkylation units produce 1 gallon of high-octane alkylate to every 65 gallons of gasoline produced in America!

BORN to meet the needs for wartime aviation fuels, Alkylation units are today contributing significantly to refinery operations. Not only are they being utilized for the production of aviation gasoline, but, more importantly, they are supplying high-octane blending components for premium motor fuel.

Kellogg has always recommended sulphuric acid Alkylation because of lower initial and maintenance costs and safer operation. The soundness of this recommendation is indicated by the number of companies that have continued the profitable operation under peacetime conditions of Kellogg's wartime sulphuric acid units.

Three new units (two in the U. S. and one abroad) now being built by Kellogg indicate that the Alkylation process is again being carefully evaluated by refiners as a means of meeting the ever-increasing octane levels.

ACID HANDLING AND HEAT REMOVAL ARE KEY PROBLEMS IN DESIGN



Alkylation employs corrosive acids in the catalyst reaction and is highly exothermic. To meet the requirements of the latter, Kellogg designed a special system of auto-refrigeration which reduces both initial and maintenance costs. To combat corrosion, Kellogg's metallurgical groups, who have conducted a continuous study of the problem for many years, incorporate in current designs all of the latest improvements in corrosive handling equipment and piping design.

IT TAKES ALL SEVEN TO PRODUCE GREATER EARNING POWER . . .

1 THE DEVELOPMENT "TOOLS"
—laboratories, pilot plants and recognized specialists to prove and improve processing and equipment ideas.

2 PROCESS ENGINEERING
by three distinct groups of specialists—*sequence* engineers, *unit* engineers and *development* engineers—supported by an extensive reservoir of exclusive data.

4 SPECIALIZED BUYERS
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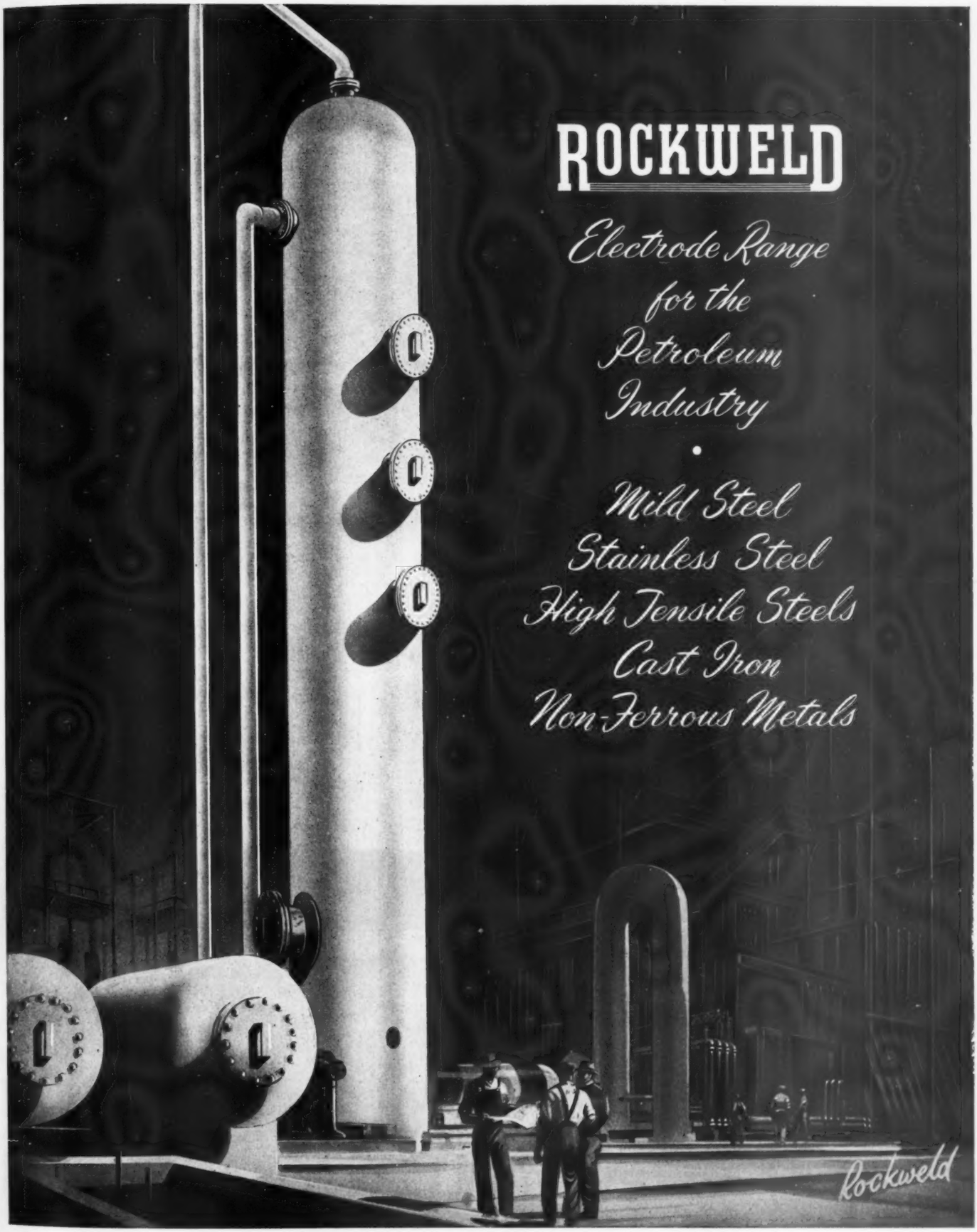

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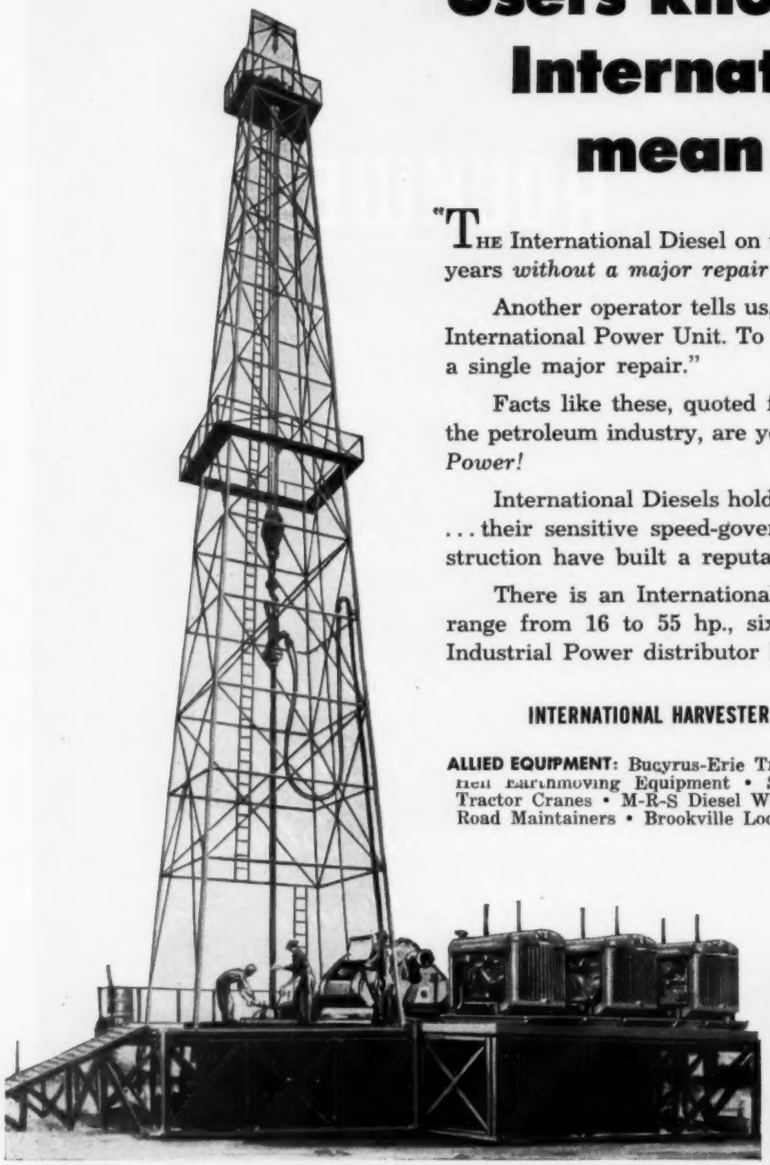

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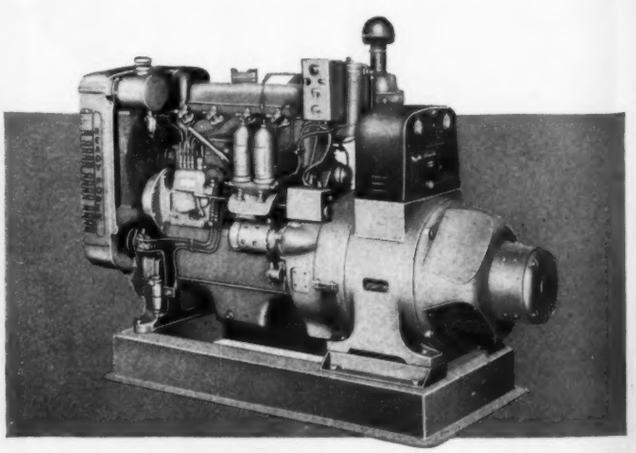
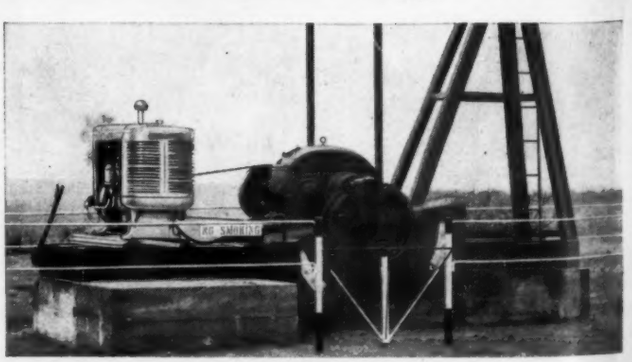


★

Above: The exclusive International gasoline-conversion starting system gets these International UD-24 Power Units going fast on this drill rig. Such multiple units provide flexible, economical power.

★

Above right: A complete range of sizes plus economy of International Diesels make Ready-Power Engine Generators popular choice for oil field electric power.



★

Right: Continuous, dependable power from an International UD-6 keeps costs down and the oil flowing on this pumping installation.

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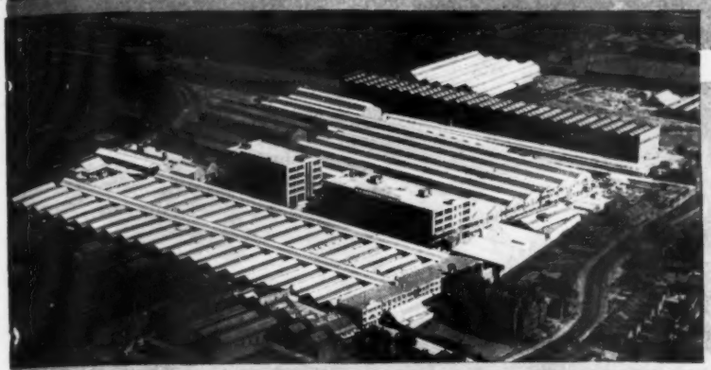
POWER UNITS

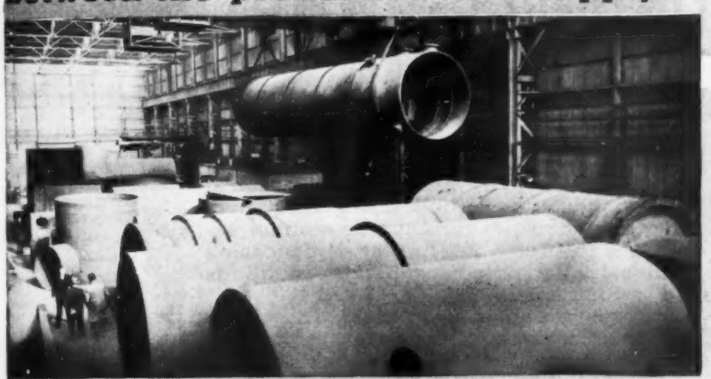
There is a wide gap, measured in terms of both time and distance, between a drawing-board in Britain and an oilfield in Venezuela.



Harvey's Works

where the plans are laid,

In the immediate Postwar period, there was a gap, just as vast, between the production and supply of plant for the growing Oil Industry.



the parts assembled,

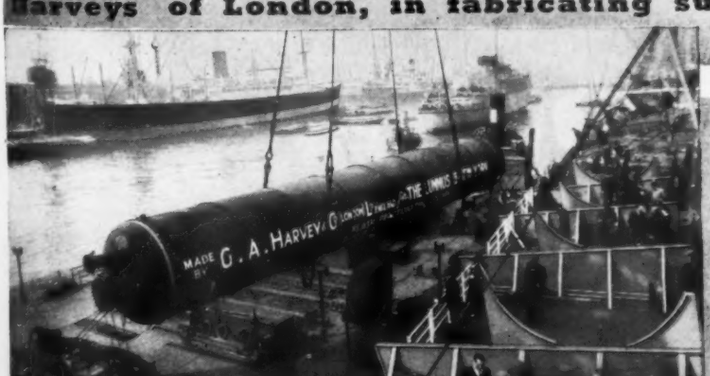
& the welding x-rayed.

But the need for Refinery Plant had been foreseen by Harveys of London; they instantly harnessed all the huge resources of their organisation

The column is transported,

with minor incidents,

and, by doing so, reaped the reward of their foresight and enterprise. Harveys of London, in fabricating such items as Fractionating Columns,



to be loaded at London Docks

& off-loaded off Venezuela.

are triumphantly meeting the urgent needs of Oil Producers and Refiners.

These Fabrication and Transport scenes are, in part, taken from a Shell series covering the whole operation of producing Oil Plant.

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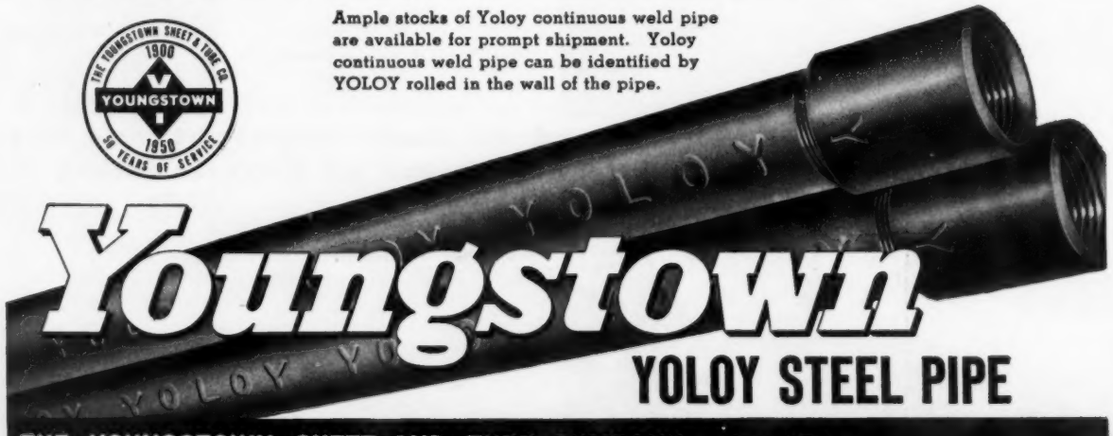
Ample stocks of Yoloy continuous weld pipe are available for prompt shipment. Yoloy continuous weld pipe can be identified by YOLOY rolled in the wall of the pipe.



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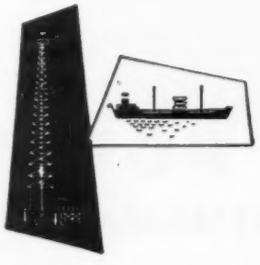

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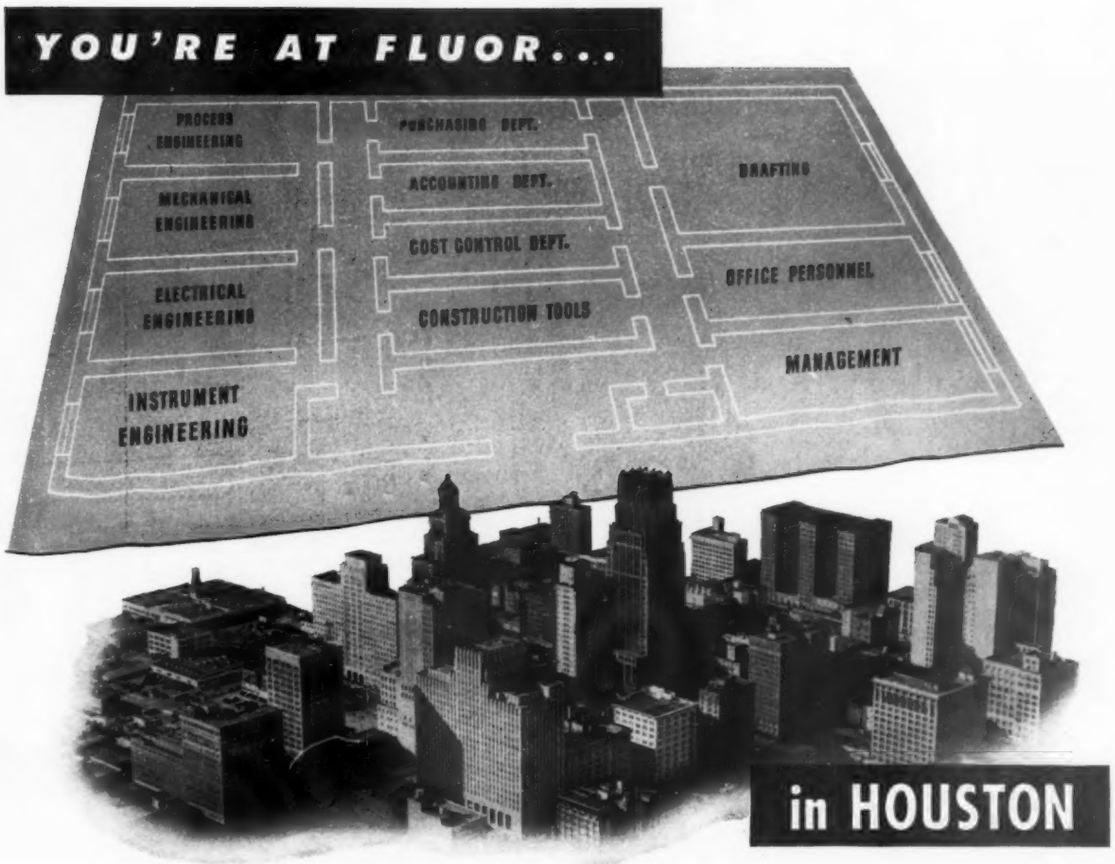

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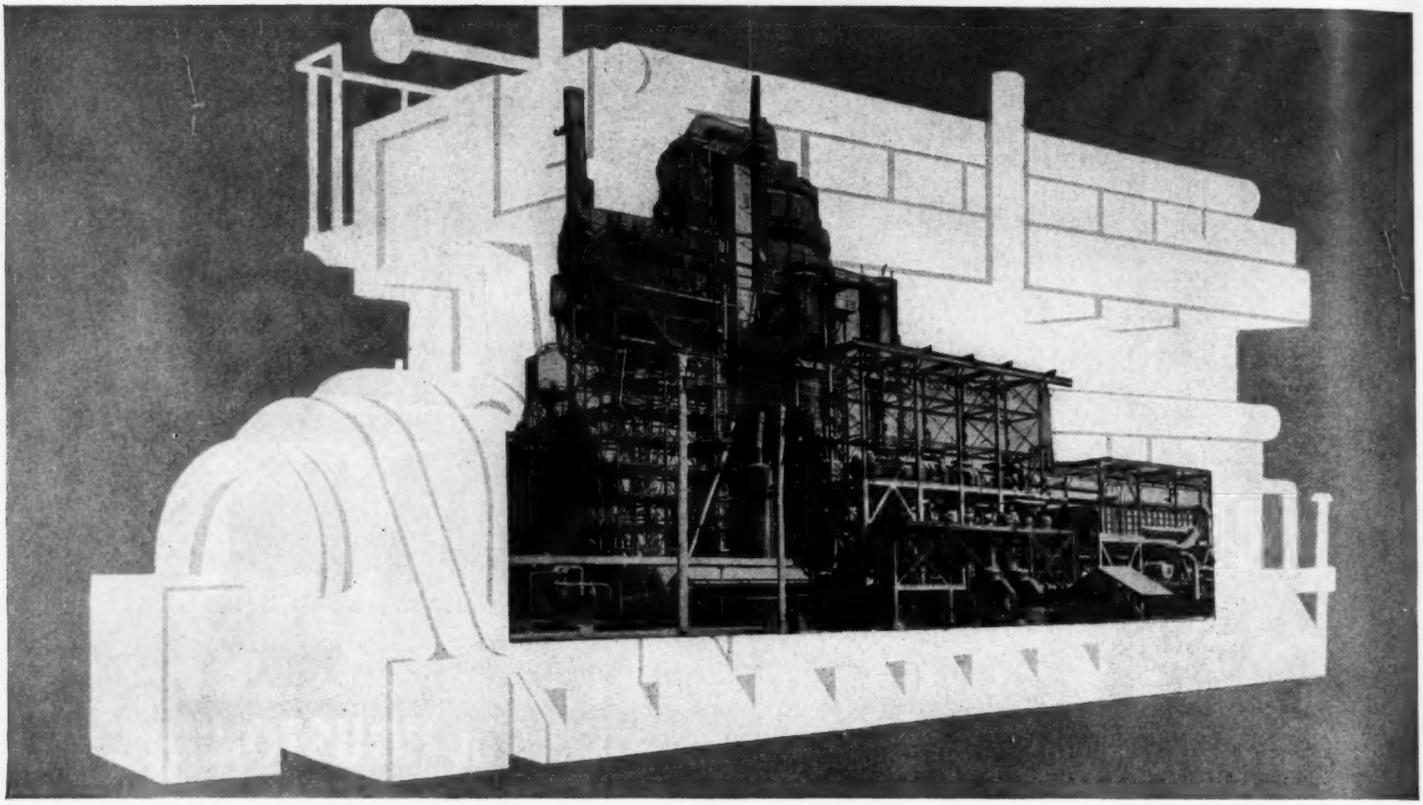
One of many Caltex installations – section of refinery at Bahrein, Persian Gulf...



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founded by Russell Palmer

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THIS MONTH'S COVER

Expansion of oil loading lines laid on the 2,805-foot oil pier at Mena al Ahmadi, Kuwait, is provided for by loops over the compressor house on the pier itself and by Z bends at the end of 4,140-foot approach pier. Range of temperatures encountered on the pier is from 30 to 170° F. Photograph is by Fox Photos, Ltd., for Kuwait Oil Co.

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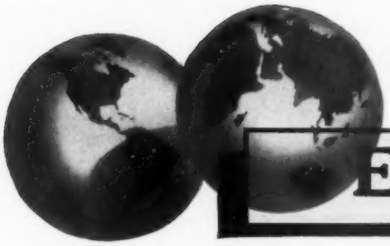


Editorial

One Petroleum World

MANY times over many years attention has been called in these pages to the fact that oil is fundamentally an international commodity, that discoveries and developments in one part of the world inescapably have an effect upon the industry in every other field of its operation. It is true, of course, that there are wide differences in the quality and adaptability of crude as it exists in its underground depositaries in different countries or in different fields within a single country. But scientific study and practical invention have combined to overcome many of these variations, to discover methods of eliminating undesirable components and even to rearrange molecules to give the exact yields of products most in demand. Progress in this latter direction has been greatly accelerated in recent years by the application of catalytic agents of various kinds.

As a result of technical advancement, practically all hydrocarbons in liquid or gaseous form have found places of usefulness in easing the burden and multiplying the efficiency of mankind's endeavors. The wide distribution of this great natural resource, which has been found in quantity in every quarter of the globe, has put it within the power of almost all peoples to take advantage of its potentialities.

In the utilization of this resource, however, there has been great inequality. The most remarkable progress has been made in the United States, due possibly to a combination of favorable factors. Among these may be mentioned the rapid spread of production following the start of the industry on its commercial career in 1859, the fact that the country, sparsely populated at that time, afforded a broad field for industrial development, and finally the native aptitude of Americans for the replacement of hand labor by power equipment which led to the development of the modern system of mass production. The experience gained by American operators in the building up of their own industry and the specialized equipment developed in the course of its progress were later applied to the finding and production of oil in many parts of the world so that a very large proportion of present day output is the result of their enterprise. The same policy of developing outlying oil production has been followed to a great extent by British and Dutch companies so that capital and management, representing the interests of these three, now direct the great bulk of oil production and processing, regardless of locale.

In the course of events since the close of World War II which has forced the free nations of the world to draw together for defense against the aggressive designs of Communism, their strongest weapon, if properly employed, is possession of eighty percent of all power resources, including petroleum, and consequent superiority in ability to supply the mechanism both of production and destruction.

Through force of circumstances rather than from choice, these nations are being drawn together to unite their energies and their resources in the common cause of freedom. A first important step in this direction was the initiation by the United States of the plan for assistance to the industrial recovery of nations prostrated by the war and its implementation through the Economic Cooperation Administration. Though bottomed on American aid, the work of this organization has been made effective through the full cooperation of the other nations included in the program, and its effect is visible in the truly remarkable recovery accomplished in western Europe.

A second step is now being taken in the effort to marshall the resources of the nations committed to the cause of freedom and to organize these resources in effective fashion for the common defense. This task, though presenting numerous difficulties, is one that must be performed as a matter of preservation. Because of the fundamental importance of petroleum in all phases of industrial activity and especially in all military operations, it is inevitable that it will receive primary consideration in the planning of joint defense. The tactical advantage of preponderance in the control of petroleum supplies is enhanced by the strategic location of many large fields and installations near areas likely to be involved in a war of world dimensions. Without advance planning for their defense, however, such locations may prove a liability.

It is a matter of necessity that provision be made for the protection of all important sources of supply, of the transportation routes over which oil must move, and of the plants in which it is manufactured into essential products. This, of course, is a task for military strategists, aided by consultation and cooperation on the part of representatives of the oil industry. In two wars petroleum has given convincing demonstration that it is the basic element in the final decision, and no local rivalries or nationalistic tendencies should be allowed to interfere with its full utilization, should the conflict of ideologies move to the ultimate stage of arbitrament.

Government Moves Toward Industrial Mobilization

By J. B. HUTTLINGER

Washington

A STEPPED-UP defense effort in the United States and western Europe, touched off by the outbreak of the Korean conflict, is solving some worldwide petroleum problems and opening up a whole set of new ones.

Eliminated by the preparedness program, with its increased world demands upon the oil industry, is the question of oil imports to America. During the past 18 months, this issue was under constant agitation. This is ended now as American producers approach the year end breaking records, and the need of imports has silenced opposition.

Attention is now directed, both in the industry and here in Washington, to meeting requirements projected in an ever-rising curve for the foreseeable future for crude and products, transportation and refining capacity both within and outside the United States. Actual military needs and provision for an enlarged defense program account for part of the overall increase; civilian economies operating at peak levels absorb larger shares. First pinches already are being felt or foreseen in aviation gasoline, certain grades of lubricating, fuel and diesel oils and some specialty products. The high octane race in motor gasoline is already a casualty of the spreading mobilization.

Worldwide planning is the order of the day,

William H. Harrison

although the United States, as the largest single producer and consumer of petroleum products, is the bell-wether in any overall petroleum decision. During the past two months intermittent British-United States meetings in Washington have discussed a North Atlantic Pact for petroleum. Emphasis was on the Middle East, and officials of Great Britain are understood to have urged U. S. officials to guarantee defense of the area in the event of total war. With Europe's doubled refining capacity of the past few years heavily dependent upon Middle East sources, their loss would be extremely serious. Even though United States officials have warned that protection might be impossible, Britain is understood to have made headway. Tip off to the American attitude on this question may come in the next few weeks in decision as to the export of steel for a new Middle East pipeline. Other than this, the talks have related to exchange of products and facilities, and common pools of supply for an integrated armed force in the event of total war. Disclosure of details on these matters will have to await the course of events. Diplomats are trying to remain silent on the subject.

In the United States the Korean fighting and its implications have raised military demand, which had been about 35 million barrels for the second six months of this year, to 51 million. Much of the increase is made up of requirements for aviation gasoline, which increased from eight to 16 million barrels. Figures for the first six months of 1951, as of this writing, are of about the same magnitude. To realize what is meant by a military demand of 32 million barrels of avgas of higher than 100 octane, it must be recalled that Bureau of Mines figures show a total United States output last year of only 35 million barrels.

Unforeseen pressure of military plus civilian demands brought about a rise in avgas prices, with West Coast prices advancing about 30 percent, according to military officials, but this situation soon began adjusting itself. Yields of high octane were increased, and idle facilities for producing alkylate and other components got into production. But the avgas shortage was so bothersome, temporarily, as to prompt Secretary of Interior Oscar Chapman to dispatch a telegram to refiners urging them to maximize yields. "Speed is vital," he said, outlining a seven-point program to meet critical military avgas situation. If extra production costs more, the military will pay the bill, he added.

Increasing pressure for West Coast supplies has revived interest in a Texas-California pipeline. A new company, West Coast Pipe Line Co., Dallas, has announced plans for a 1,000-mile line to tap some of the excess production capacity of west Texas. Turned down during the last war, the idea appears to be looked upon with more favor today under different conditions.

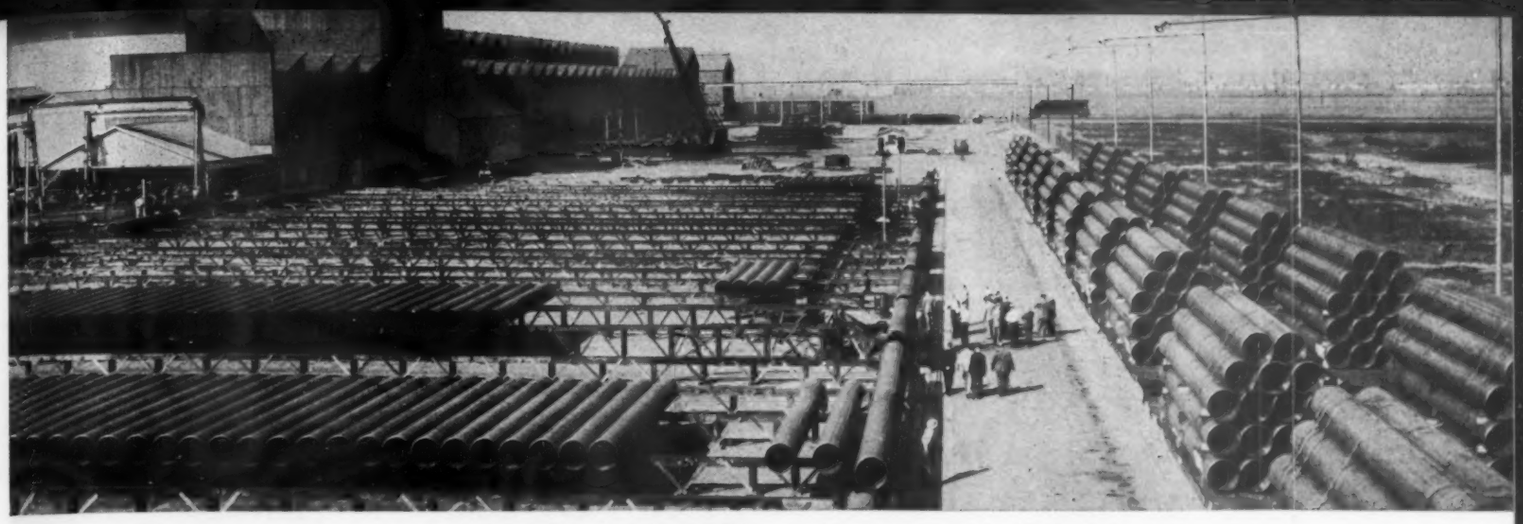
W. Stuart Symington

To fuel the actual fighting by the forces in South Korea as well as all U. S. military demands, continental United States refineries are being relied upon for two-thirds of the products. While the Pacific Coast of the United States is 6,000 ocean miles away, it remains the nearest source for many products. The Middle East is supplying motor gasoline, diesel and Navy special oil in additional amounts. While the area was expected to furnish 10 million barrels for the last six months of this year, the estimate now is 15 million barrels. What avgas production the Persian Gulf provides under British control is needed for Britain's mobilization and training program.

Meanwhile, the administration is moving to put in operation some of the controls that have been authorized by Congress. So far as petroleum itself is concerned, it is felt that with the Oil and Gas Division of the Interior Department functioning in conjunction with the National Petroleum Council and its committee on military requirements, no additional machinery is necessary immediately. If developments should require more extensive mobilization of the oil industry, the blueprints are in readiness for setting up the necessary organization. It is reported, without confirmation, that Ralph K. Davies, president of the American Independent Oil Co., who was executive head of the Petroleum Administration in World War II, has been urged to resume his post in such eventuality.

Most important to the oil industry of current official moves toward regulation, following the appointment of W. Stuart Symington as overall coordinator of the preparedness effort, is the order establishing a National Production Authority in the Commerce Department under direction of William H. Harrison, president of the International Telephone and Telegraph Corp. The agency will handle priorities, allocations and inventory controls. One of its first tasks will be to look into the subject of vital steel requirements and to establish a system of allocations, if needed. Coincident with the announcement by Secretary of Commerce Sawyer of the establishment of NPA was the reimposition of export control over steel.

(Please turn to page 64)



Large diameter pipe stacked for shipment. Photo courtesy Columbia Steel Co.

Steel Industry Prepared To Meet Expanding Needs

CLOSE dependence of oil industry development upon the availability of various steel products has found expression in the phrase, "Steel is oil." Such primary operations of the oil industry as drilling, pipeline transportation and refinery construction and equipment obviously cannot function without ample supplies of drill pipe, casing, line pipe, sheet and plate. In addition large tonnages are required by the marketing division of the industry for station equipment, containers, storage tanks and trucks. Aside from all these are the oil industry's requirements for buildings and for the tankers and barges which constitute a large portion of steel consumption by shipbuilders.

Not all of these latter uses figure in the statistics of steel usage which are compiled from year to year. Taking into account, however, only the products that move directly to oil operators, steel product shipments for 1949 show that the oil industry took 4,478,000 tons or eight percent of total distribution for drilling, pipelines, refineries and similar uses. It ranked along with construction and the manufacture of containers, (the latter including a substantial proportion destined for oil, as mentioned), and exceeds all other single industries except automotive, which, of course, leads the field by a wide margin.

In view of the rising pressure upon the oil industry for a greater output of its own products, it is encouraging to know that steel manufacturers in the United States have invested over two billion dollars in expanding their plant facilities during the past four years and have projected a similar rate of expenditure up to 1953. More than six million tons have been added to yearly plant capacity for ingot production since the end of 1947, and another 5.5 million tons will be added by 1953 under plans already approved and under way. Production of ingots and steel castings has been running in recent months at a rate of about eight million tons, and a new high basis of yearly capacity was set by the industry as of July 1, 1950, at a total of 100,563,000 tons.

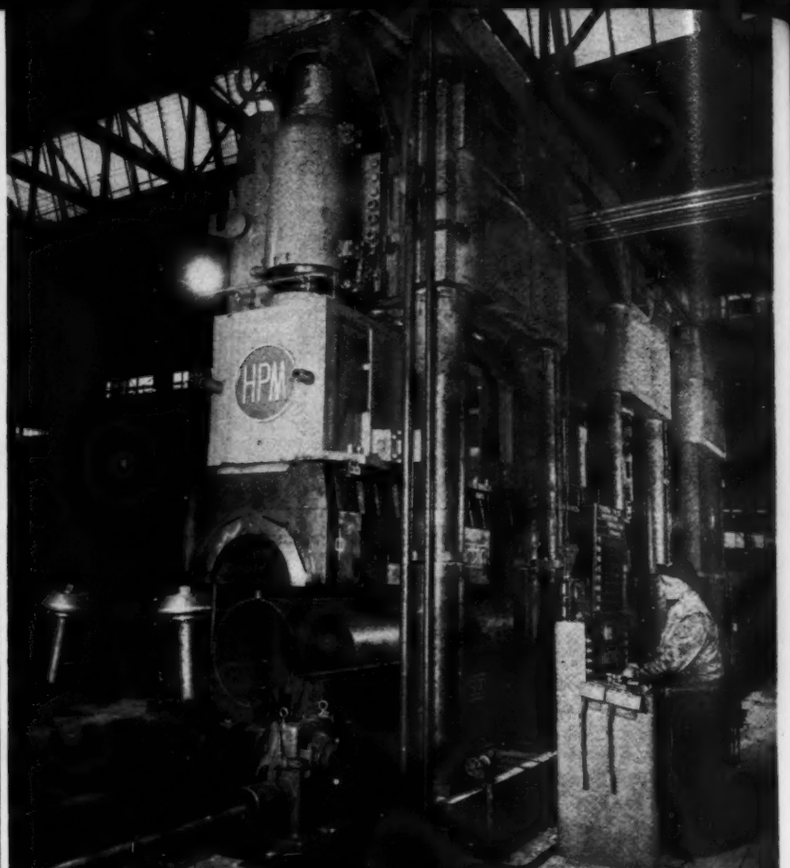
In the ten years 1939-48 inclusive, steel capacity increased 15 percent while production increased 68 percent. This comparison is not as remarkable as the mere statement would indicate because at most times in the past fifty years the productive capacity of the country's steel mills has been far ahead of the yearly requirements of consumption. Production in fact has been subject to wide fluctuations. It fell below 20 percent of capacity in 1932 in the depths of the depression that prevailed in that period and averaged only 48 percent during the whole decade of the thirties. It is only under the pressure of war or of extraordinary industrial activity that the industry has come near to utilizing its full facilities. Thus in World War II it rose to 98 percent of the 90-million-ton capacity existing in 1943. Under the heavy pressure of war demand, capacity was increased over thirteen million tons between 1940 and 1945. Following the slackening of demand that came with the close of hostilities, some plants were closed down for needed repairs and rehabilitation, and the industry began a program of readjustment to peacetime conditions including the construction of enlarged facilities for the fabrication of products increasingly in demand and the introduction of improved processes that had been developed.

The advancement that has been made in these postwar years constitutes an outstanding record and has raised the steel industry to a new high level of productivity and efficiency.

Practically every steel fabricating company in the country has shared in this expansion, which includes coke ovens, blast furnaces for pig iron production, steel furnaces for ingots, rolling mills, tin plate and wire mills and equipment for making all sorts of steel products. Particular attention has been given to provision for certain classes of goods for which an entirely new or greatly increased demand is developing. In the oil and gas industry, for example, line pipe of much greater diameter than that formerly in use is being specified for long-distance lines. To meet these growing requirements, hundreds of millions of dollars have been invested in plants specializing in large-diameter pipe. United States Steel Corporation, as the country's largest steel maker, has been active over a wide area in this particular field. It acquired the Consolidated Western Steel Company in California which supplied the pipe for two large Middle East lines, and opened a large plant at Orange, Texas, in April of this year, which has a capacity of 100,000 tons per year. National Tube Company, another member of the U. S. Steel group, completed early in 1950 a plant at McKeesport, Pa., for the production of 100,000 tons yearly of electric welded steel pipe in sizes ranging from 26 to 36 inches in diameter.

For the past year Republic Steel Corporation has had in operation at Gadsden, Ala., a newly built mill equipped to manufacture pipe of the largest size. At Houston, Texas, the A. O. Smith Corporation in conjunction with Armco Steel Corporation is opening a

Transforming flat steel plate to U-shape, a step in pipe production.



O-ing machine completes pipe formation under 18,000-ton pressure. Photo courtesy National Tube Co.

pipe fabricating plant with a capacity of 40,000 tons per month. On the Pacific Coast Kaiser Steel Company is devoting the facilities of its plant largely to the production of line pipe.

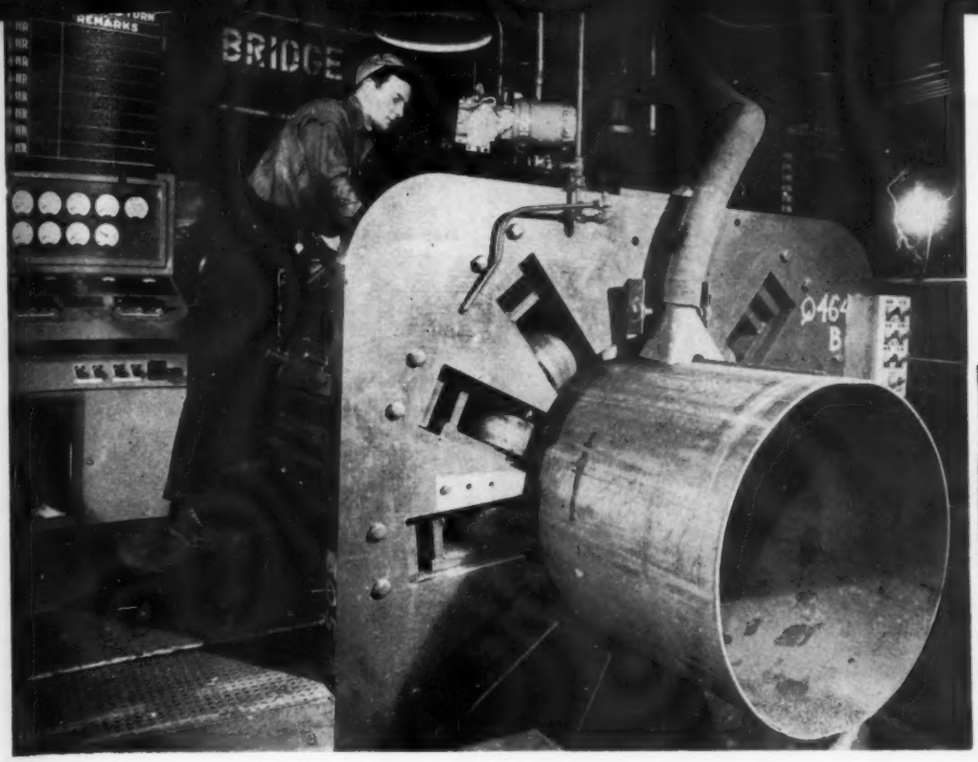
Heavy and expensive machines are required for the forming of large-diameter pipe which now is usually turned out in sections 40.5 feet in length from plates a quarter or half inch in thickness and varying in width according to the ultimate diameter of the pipe. Each plate weighs from two to three tons as delivered to the pipe mill and is first subjected to shearing and beveling treatments, and its edges are crimped by a specially designed crimping roll. It then passes through two giant hydraulic presses. The first of these, called a U-ing press, weighs 280 tons and exerts a 2,000-ton pressure. It bends the plate to a U-shape and it then passes to a giant press which weighs 675 tons and has a pressure of 18,000 tons. This is called the O-ing press and forces the plate into the circular form required. The section then is ready for the electric welder which automatically welds the seam inside and outside. Final treatment is applied by the hydraulic expander which forces water into the pipe under a pressure of 3,000 psi and stretches it to the exact diameter specified, at the same time reducing its length slightly and adding to its strength.

While an adequate supply of line pipe is of primary importance to the transportation section of the oil industry, the production division is even more concerned with tubular goods with which to equip the greater number of wells needed to meet growing requirements under existing conditions. In this direction the steel companies have added much new capacity through such reconstruction work as that of National Tube Company at its McKeesport, Pa., Lorain, Ohio, and Gary, Ind., plants, the enlargement of the Youngstown Sheet and Tube Company's works at Youngstown, Ohio, by 550,000 tons yearly, and numerous other plants specializing in this type of production. The result of recent building operations is seen in ingot production of half a million tons monthly more during 1950 than the year before.

The steel industry is carrying out a well-rounded program of expansion for all its principal products which makes possible great additions to its output of all kinds of structural steel for building construction, machinery and appliance manufacture and a multitude of miscellaneous uses. The rapid increase in container requirements including containers for petroleum products, has led to the enlargement of plants devoted to this field of activity. The United States Steel Products Company is erecting a plant at Port Arthur, Texas, for the manufacture of steel drums and other containers. United States Steel Corporation also is preparing to construct a complete steel plant at Morrisville, N. J., with a capacity of 750,000 tons yearly. Other notable programs are those of Jones & Laughlin Steel Corporation adding a million tons to capacity at Pittsburgh, Pa., Bethlehem Steel Company's investment of $32 million to increase the capacity of its Johnstown, Pa., works by 15 percent, Inland Steel Company's new plant at Chicago, Ill., which will add 750,000 tons of finished steel per year, and 500,000 tons resulting from new construction by National Steel Corp. In the next two years the industry as a whole will have added five million tons to its yearly ingot capacity under plans already under way.

The progress that has been made, both in supply and consumption, is indicated by a brief comparison. In 1900 steel production provided 300 pounds for each person in the country. By 1920 this figure had grown to 886 pounds, and in 1929 it was over 1,000 pounds. During the depression years of the thirties, it fell off, but by 1940 it was back to the one-thousand mark, and in the succeeding war years it rose rapidly to 1,302 pounds. At the present rate of operation, output will be at about the same per capita rate in 1950 or approximately one ton to each adult person in the country. In comparison with the rest of the world, the progress has been equally striking. Of the total world output of ingots and castings amounting to 151,760,000 tons in 1939, the United States provided roundly 53 million or 35 percent. By 1948 its share in a total of 170,150,000 was 88,640,000 tons or 52 percent. While exports took an abnormal proportion of American output during the war years, they have fallen off in the postwar period to about eight percent in 1949.

According to Washington military authorities the present conflict in Korea will require no more than about four percent of American steel production, which can be readily supplied without interfering seriously with other requirements. The rearmament program on which the United States is now



Electric welding outside seam of 30-inch diameter steel pipe. ←

Completing inside weld of 30-inch pipe. ↓

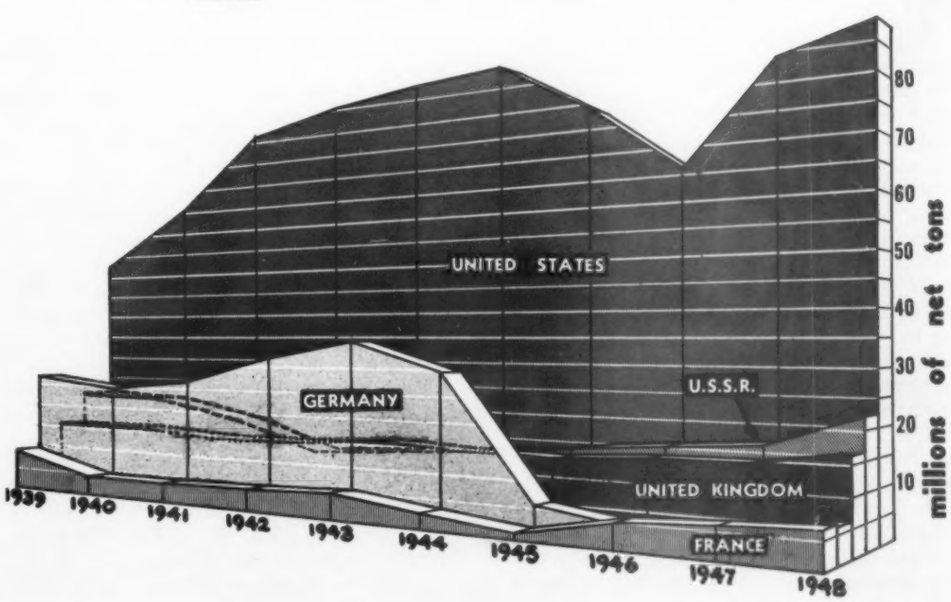
embarking will call for larger quantities of steel products for many purposes. It is recognized, however, that an increased output of oil and additional reserves is an essential factor in upbuilding the nation's defensive strength, and provision of materials for the expansion of available petroleum resources is promised as part of the national program.

A steel requirements committee of the National Petroleum Council has been engaged during recent weeks in collecting information as to the oil industry's requirements of steel under the enlarged defense program which the government is instituting. The data collated from reports by six subcommittees shows estimated requirements for refining, transportation, production, distribution, foreign and storage segments of the industry. It probably will be made public by the time this article appears.

A similar report prepared in 1948 placed the oil industry's steel needs at 10,300,000 tons annually to meet the then rapidly expanding requirements. The largest single item noted was 2,639,000 tons for field operations. In view of the need for higher production and larger reserves, requirements in this branch of the industry probably are greater at this time. On the other hand, they may be somewhat less in some other directions, as in the foreign operations of American companies, owing to the enlargement of steel capacities outside the United States. Assuming that the total may be somewhere near the earlier figure, it would call for approximately 9.8 percent of present capacity, or very little more than the actual percentage going to oil industry use during the past year. Productive capacity for such highly important products as line pipe and tubular goods has been greater than that for the industry as a whole so that the steel mills are in a good position to supply whatever additions to output may be required.

Whenever extraordinary conditions create added pressure for steel products, a certain element in federal administration circles puts forward a proposal that the government inject itself into the industry, either by the direct construction and ownership of plants or through loans for the expansion of facilities. Preliminary to government invasion of the industry, federal regulation of its operations and rationing of its products are urged. Informed opinion both inside and outside the steel industry holds that such action not only is unnecessary but would be harmful in effect. Under the defense control bill recently passed by Congress, the President has authority to allocate materials, and if such action appears necessary to assure an equitable distribution of steel products, it will be accomplished through a government-industry committee operating under direction of the Secretary of Commerce, as was done in 1948. So far as meeting foreseeable needs is concerned, the steel industry has shown its ability and alertness and its preparedness campaign was started well before the government undertook steps in that direction.

U. S. steel production compared with other nations.



Breakwater south of the oil loading pier in course of construction. Two breakwaters form a harbor for barges and small craft. Fox Photos, Ltd., London.

Map showing location of Kuwait with reference to nearby nations.

Kuwait Completes Model Oil Port

By E. Lawson Lomax

THAT the Al Burgan oil field of the Arab State of Kuwait in the Persian Gulf is one of the largest single oil fields yet discovered is a well-established fact. The phenomenal rise in production from this field from an average of 27,700 barrels a day in 1946, when commercial shipments first began, to no less than 317,700 barrels a day in 1950 testifies to its importance. But Kuwait itself consumes only a very small fraction of the oil found within its borders and is remotely situated from the centers of industry where oil is required. Once the prolific character of the Kuwait field was established, the main problem was that of moving its large production to the world's oil markets.

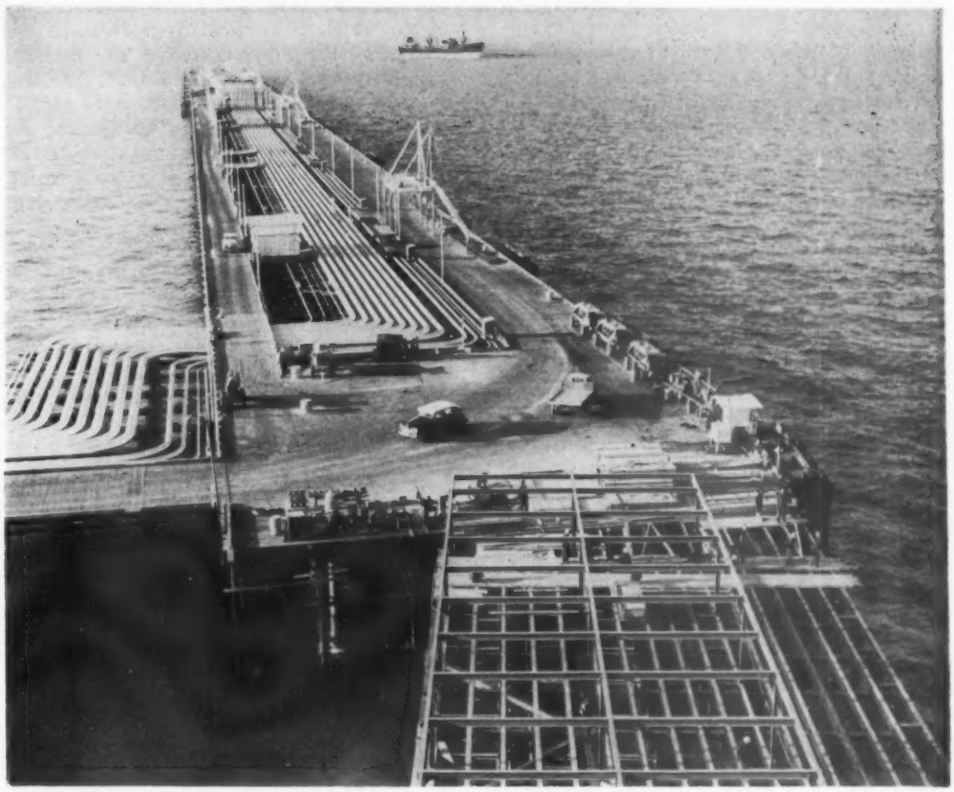
To bring crude oil from the wells of the Al Burgan field to the coast of the Persian Gulf some 14 miles away presented no special difficulty to the Kuwait Oil Company's petroleum engineers, for the desert terrain of Kuwait rises from the sea in a series of gentle undulations so widely spaced that only a single ridge of some 400 feet in height lies between the field and the coast. This ridge provided a convenient site for storage tanks from which the oil would flow by gravity to the loading terminal. The nature of Kuwait's coast line nearest to the oil field area, however, did little to simplify the problem of bringing the oil from shore to ship. There is no inlet or bay to give protection to the shipping from the strong winds which prevail in the Persian Gulf, and the sea remains shallow for considerable distances offshore. Even in Kuwait Bay to the north, large vessels have to anchor several miles from the town. It was, therefore, apparent from the first that the creation of facilities for the loading of tankers commensurate with the capacity of the field would be a task of considerable magnitude and that, to enable the movement of oil to proceed in the meantime, temporary facilities which could be quickly, simply and cheaply installed would be needed.

At the beginning of 1946 operations were begun to lay on the sea bed to a distance of approximately a mile from low water mark at a point between the villages of Fahaheel and Shaiba the first of a series of 12-inch submarine pipelines. In addition a hose buoy to which the submarine line was connected and two mooring buoys at which tankers could make fast were placed in position. The submarine line was first laid on land, and after being given a protective coating of coal tar enamel, was placed on trolleys running on decauville track, the line of the track forming a projection of the position for the pipelines on the sea bed. The pipeline, sealed at both ends to give it buoyancy, was then pulled out to sea by a tanker navigating on prearranged shore marks. Between 1946 and 1949 ten such lines connected in pairs to five sea loading berths were in use. The average loading rate for one of these berths was 7,540 barrels an hour.

In 1947 the company commissioned Bechtel International and associates to design and

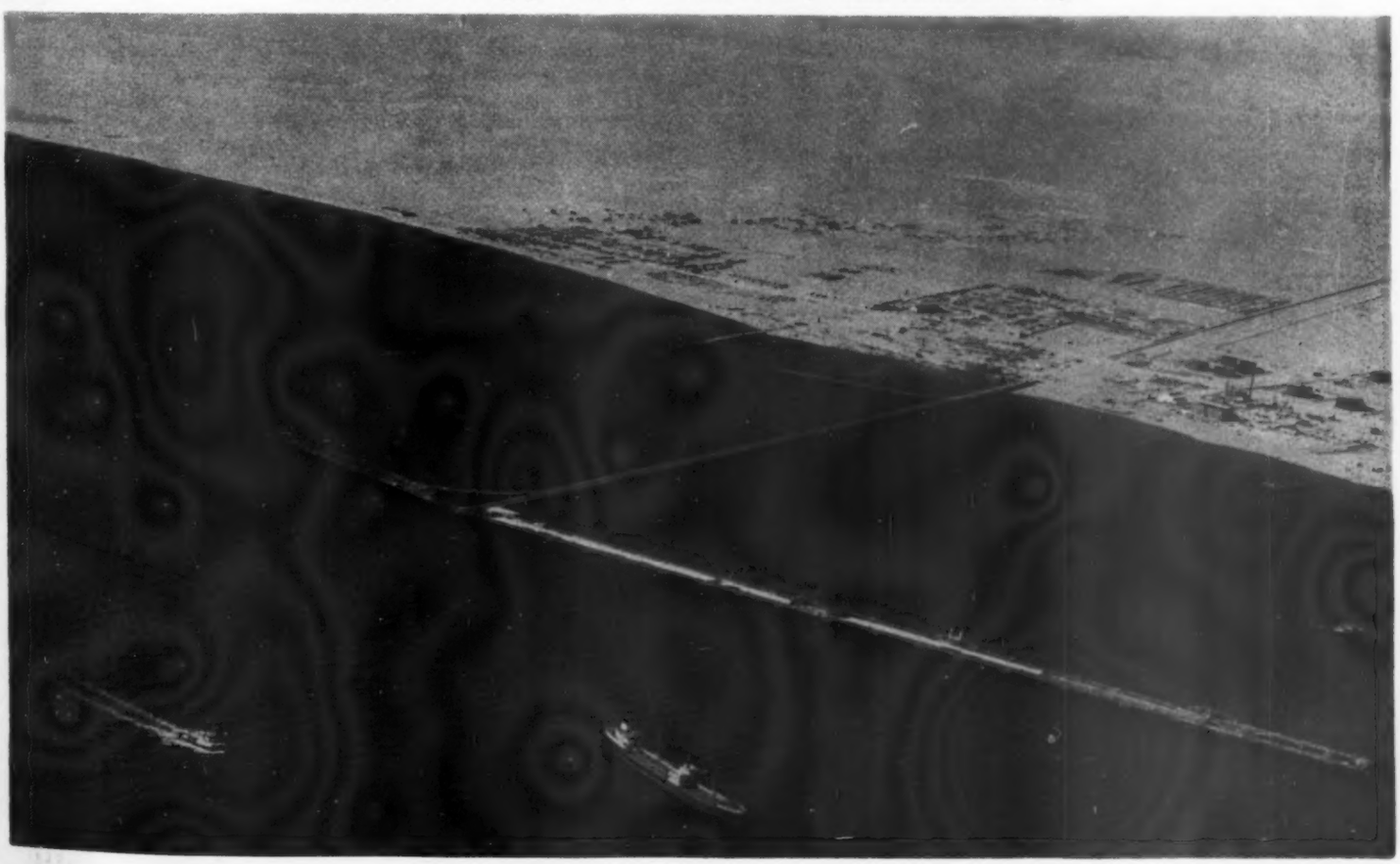
construct permanent oil and cargo facilities. The jetty was planned by Sverdrup & Porcel, one of these affiliates. Wilton H. Gerhart was chief construction engineer, with the Pomeroy interests supplying key construction men. At the close of 1949 the plans had been successfully executed. The new oil port which had come into being was given the name of Mena al Ahmadi after the late ruler of Kuwait who had taken a close personal interest in its progress. The problem of bringing the oil from shore to ship had been solved by the construction of the largest pier of its kind in the world with a loading capacity several times as great as that given by the submarine lines.

This new pier consists of an approach trestle 4,140 feet long, with a "T" head, the north and south extensions of which form the oil and cargo quays respectively. The first of these extensions, which provides six berths for the largest tankers afloat, is 2,805 feet long and 105 feet wide, dimensions which ensure the space needed for efficiency in loading operations. The shorter extension to the south, 1,077 feet long and 100 feet wide, has two berths for ocean-going cargo vessels and is connected to the approach trestle by a separate roadway to enable motor transport to reach it without passing through or near to the petroleum quays. The approach trestle, carrying a roadway 24 feet wide and a pipeway comprising eight 24-inch crude oil lines, a 16-inch line for fuel oil for ships' bunkers and a 12-inch line for diesel fuel, presents an impressive appearance and shows the degree to which the technique of pipe laying has been perfected. These large capacity loading lines, together with smaller lines for fresh water, bunker fuel and sea water and compressed air, make it possible to load six tankers simultaneously with crude oil, to supply them with fuel and fresh water, to provide temporarily the sea water needed for



Looking northward at the oil pier. Framework in foreground is for cargo pier operational building. At left are expansion Z-bends in pipe lines entering oil pier.

General view of the world's greatest oil loading pier. The approach pier is 4,140 feet long, oil pier at right 2,805 feet long and cargo pier at left 1,077 feet long. Photographs on this page courtesy of Richard Finnie, Bechtel International Corp.



cooling purposes at the nearby refinery, to have sea water under pressure ready for any outbreak of fire and to deliver compressed air for the operation of the oil hose derricks and other purposes. At the shore end of the approach trestle the pipelines are anchored by a large concrete block, expansion and contraction being allowed for by placing them on rollers as far as the head of the pier, where a "Z" bend and expansion loops absorb their movement. In Kuwait as elsewhere in the Persian Gulf, very wide ranges of temperature are experienced. In the summer it is not uncommon for the maximum sun temperature to reach 170°F, while winter temperatures may fall as low as 30°F.

Some idea of the task of constructing this pier can be gained from the quantity of materials used. No fewer than 3,851 steel piles averaging 90 feet in length, each a 14-inch "H" beam weighing 73 pounds per foot, were driven into the sea bed. To complete the main structure of the pier, 65,300 assorted pieces of structural steel, all the joints of which were welded, and 3,000,000 board feet of timber were needed. Each piece of steel was sandblasted and coated or painted as a protection against corrosion, and every piece of timber was given special preservative treatment. The total quantity of all materials used, most of which came from the United States, was just under 38,000 tons.

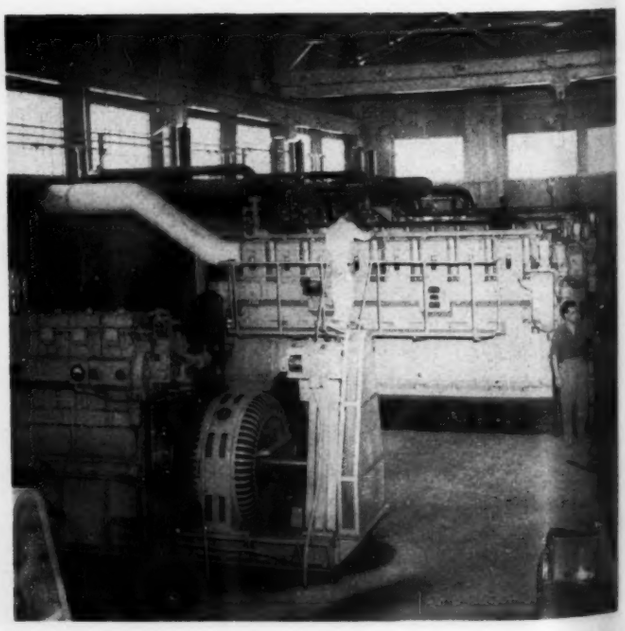
In order to ensure the maximum longevity of the pier, it was necessary to give the most careful thought to the problem of corrosion which is particularly serious in the waters of the Persian Gulf. The decision was, therefore, taken by the Kuwait Oil Company to install a cathodic system to supplement the protection afforded by the coal tar enamel with which the steel piles were coated. The principle of this system is the creation of a huge wet cell by placing magnesium anodes in the sea close to the piles which, when connected through a current limiting resister, become cathodes. The electrolyte or sea water is broken up by the current, and hydrogen ions are deposited on the steel to form a corrosion-resistant film. By this means the magnesium anodes are gradually eaten away while the steel piles remain intact. So far as can be judged at present, this cathodic system has worked very satisfactorily.

A further problem of particular interest was the design of suitable fenders to safeguard from damage in rough weather both the oil and cargo berths and the ships using them. The exposed nature of the port and the frequency of strong northerly and southeasterly winds made the solution of this problem one of the highest importance. The fender adopted by the company for the pier was invented by Professor A. L. L. Baker of the Imperial College of Science, London, and is especially adapted for conditions obtaining at Kuwait. These fenders are similar to those first built during World War II for a jetty at Heysham, England, and subsequently modified for use with the floating "Mulberry Harbors" which played an important part in the landing of Allied forces on the coast of France. The fenders in use at Kuwait consist of a set of three cylinders filled with concrete, each six feet in diameter, 21¼ feet in height and weighing 50 tons, which are suspended at the top and bottom on links between trunnions which enable them to swing inwards and upwards on the impact of a vessel. Each of the cylinders is faced by 14-inch timber. The pier head has 44 of these fenders spaced at intervals of 135 to 165 feet.

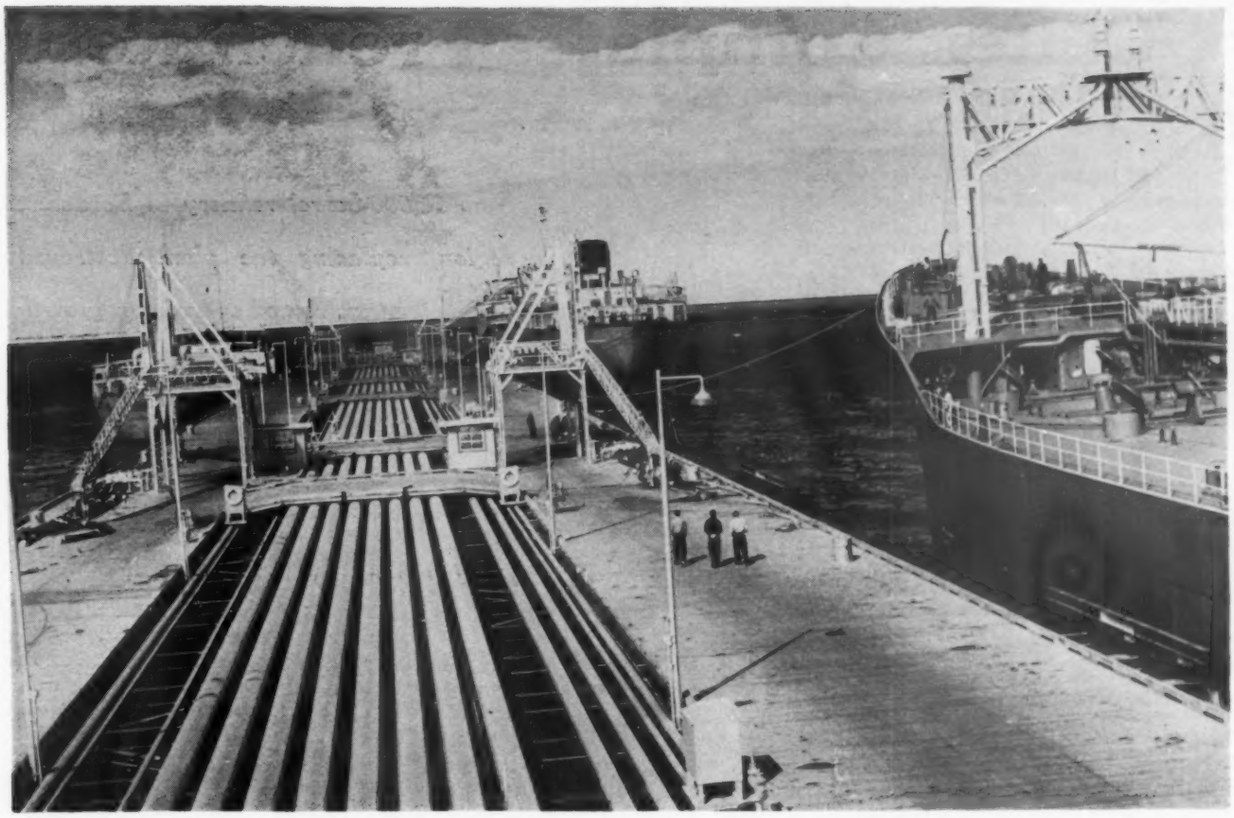
The superstructure of the pier head includes two office buildings, the first for the staff in charge of loading and the second for administrative work connected with the loading and discharge of general cargo. In this latter building there is also a recreation room for officers and crews of vessels using the port. All these buildings are fully air-conditioned. In addition there are buildings for storage, pumping stations and a compressor unit. For handling oil hoses the northern extension of the pier head is equipped with six double stiff-leg derricks, and for general cargo the southern extension has four five-ton Portal cranes and a 60-ton stiff-leg derrick.

An essential part of the port facilities required by the Kuwait Oil Company has been the construction of a harbor adjacent to the pier to give a sheltered anchorage for tugs and small craft and to provide them with the necessary servicing facilities. The breakwaters for this harbor have been constructed of stone quarried some 17 miles inland and transported to the coast by truck. Over 130,000 cubic yards of stone have been used

Above: Two six by 21-foot Baker fender cylinders ready for sand blasting. Below: A set of Baker fenders filled with concrete and faced with timbers in place on pier.



Engine generator sets and pumping equipment at Station C, Burgan, Kuwait. Three 8-cylinder, 675 hp engines drive the oil line pump. Photographs on this page by Richard Finnie for Bechtel International Corp.



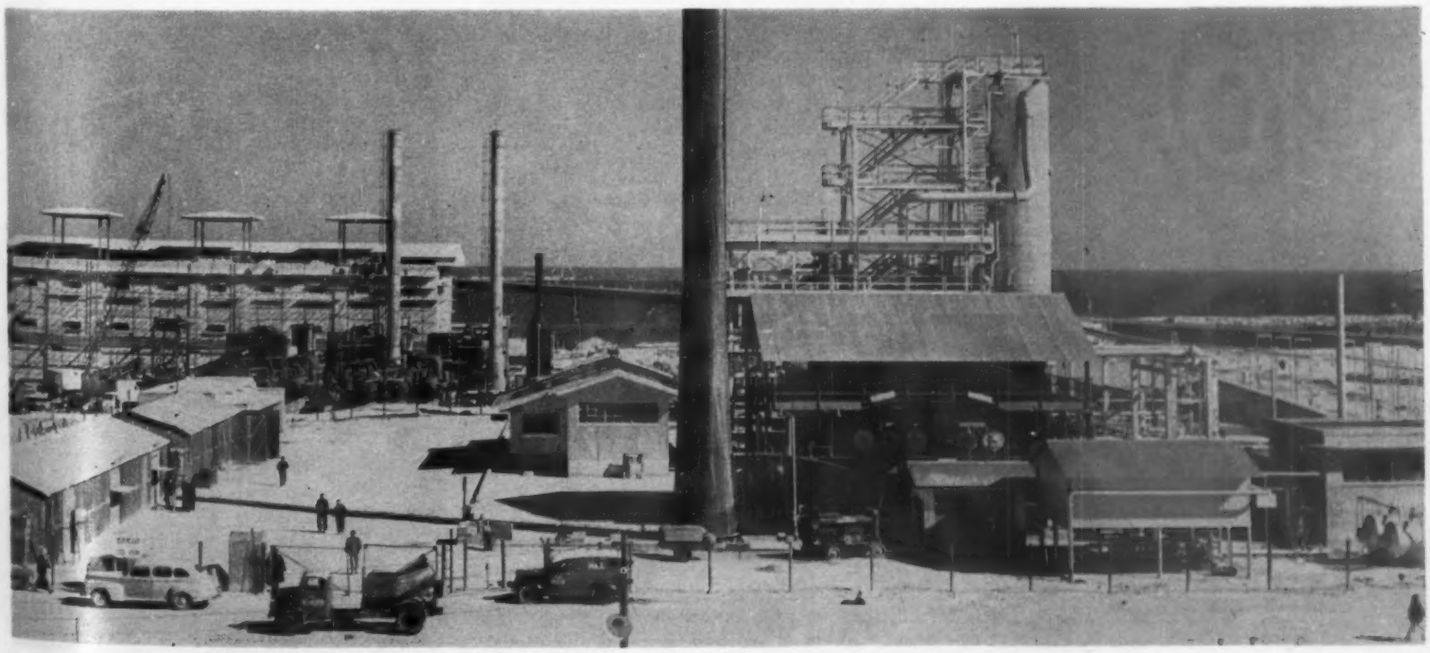
Six berths for the largest tankers afloat are provided along the 2,805-foot oil pier. Fox Photos Ltd., London.

to construct these breakwaters to a strength sufficient to withstand the violent storms encountered on this coast. To give craft using the harbor sufficient depth at all states of the tide, dredging has been necessary, and it is estimated that when this is finished nearly a quarter million cubic yards of sand, silt and coral will have been removed. Within the harbor has been built a quay, some 600 feet in length, at which cargo can be discharged from barges. In addition to this quay, a steel jetty for berthing tugs and constructed of piles similar to those used for the main pier is now in course of erection.

To this general description of the port of Mena al Ahmadi should be added brief mention of the company's refinery which came on stream in November 1949. This plant, built by E. B. Badger & Sons Co., consists of a 25,000-barrel-per-day topping unit to which is linked a small refractionator and doctor-sweetening plant capable of treating kerosene and motor gasoline fractions. The function of this unit is to provide sufficient motor gasoline, kerosene and gas oil to meet the operational needs of the Kuwait Oil Company, together with the local market demands of the Sheikdom of Kuwait and the demand for furnace oil and marine diesel oil for tankers loading crude at Mena al Ahmadi.

In the planning and construction of the oil terminal of Mena al Ahmadi were engaged men from the United States, Great Britain, Kuwait and other Middle East countries, and India and Pakistan. It stands, therefore, not only as a tribute to the engineering skill of those who designed and built it, but also as a symbol of cooperation between West and East.

Refinery and main power station at Mena al Ahmadi.



Caltex Completes French Refinery

New 14,000-barrel refinery in Bordeaux region, replacing the plant destroyed during war, welcomed as basis for growth of manufacturing industry in area.

By W. H. Pinckard
Chairman of the Board, Caltex-Bahrein Group

THE new $8 million refinery of Raffineries de Petrole de la Gironde near Bordeaux now is in full operation, processing 14,000 barrels daily of Abqaiq crude. The plant is owned by French interests and California Texas Oil Co. Construction of this plant completes the presently authorized refinery program for southwestern France under the government's rehabilitation scheme. No Marshall Plan aid was accepted by the builders, the entire $8 million cost being supplied by the oil company.

First refinery to be built on the site was erected in 1932. It was partially destroyed by German bombers in 1940, and the demolition was completed in 1944 by Allied bombing missions. Only the power plant remained relatively intact.

Reconstruction of the refinery was delayed by the government under the so-called Monnet plan on the theory that partially destroyed plants should have priority and completely wrecked installations be rebuilt later. In this way the government believed that at least partial supplies of locally refined products could be made available at an earlier date. It was not until 1947 that a license to build the refinery was granted to Caltex. Construction was begun in 1948.

Completion of the Caltex plant adds another six percent to the rapidly growing French refining industry, which already is nearly double its prewar size. In 1938 French refineries processed 137,000 barrels of oil daily. The war destruction was so complete that the daily average for 1945 was only 6,000 barrels, but temporary repairs enabled refiners to handle 56,000 barrels in 1946 and 100,000 barrels in 1947.

With reconstruction and new building getting well under way, French operations increased 65 percent in 1948 to pass the prewar level of runs, and last year there was a further expansion of 40 percent, bringing runs to 230,000 barrels daily. This is enough to supply all French domestic needs as well as nearby possessions.

W. H. Pinckard

Under the French national plan, it was decided to build refining capacity as nearly as possible in the center of important consuming areas. Thus the capacity of the Caltex plant is approximately double that of the prewar refinery.

Bordeaux interests are dissatisfied with the million-ton annual limit on local plants. At the recent plant dedication ceremonies both municipal and department officials said that capacity should be at least double that now permitted. It is the ambition of local men to diversify the business of the region by creating a manufacturing center. Hydroelectric power is not available in the Bordeaux area, and it is distant from coal beds. Local interests hope to develop a large power supply on the basis of oil fuel. They point to the nearby gas and the recently discovered oil field as being favorable for the manufacture of low-cost power. Potential production of the new Lacq oil field is now about 3,000 barrels daily, and all the oil being produced is going to Pauillac. Present output of the field is about 2,000 barrels daily.

Site of the refinery is on a finger of land near Bec d'Ambes where the Garonne and Dordogne rivers flow into the Gironde, 15 miles north of Bordeaux and some 50 miles from the seacoast. The 138-acre site originally was filled land and required rebuilding by pumping in 40,000 tons of sand before construction could get under way. It was necessary to drive piles to provide adequate footings for all major structures except tankage.

When approval to rebuild the plant was given in 1947, Arthur G. McKee & Co. was retained to design and supervise erection of process equipment. French engineering groups were employed to rehabilitate existing installations and to build tankage, fire fighting and dock facilities. The steam plant was reconditioned to provide 115,000 pounds per hour and the electrical plant to produce 1,300 kw.

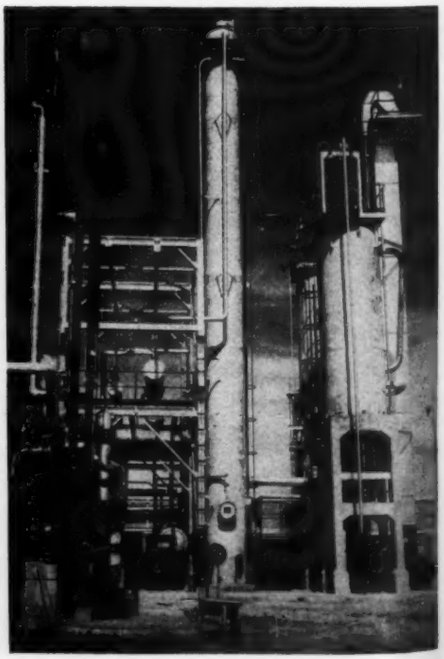
The Bordeaux Port Authority erected dock facilities for the unloading of 15,000-ton ocean tankers adjacent to the plant site. Caltex built its own pier for loading barges for inland distribution of products and coastwise tankers for more distant points along the Atlantic coast. Overland freight movement from the plant site is both by rail and truck. Loading racks can accommodate 50 tank cars and 40 trucks.

Tankage at the plant site with a capacity of 410,000 barrels was in good enough condition for repair. To supplement this, 960,000 barrels of new storage has been erected.

In its essentials the Ambes refinery consists of a crude distillation unit, naphtha rerunning unit, UOP thermal reformer with clay treating towers, gasoline stabilizing towers, treating and sweetening plant for motor fuel and kerosene. The crude unit is of conventional design calculated to process 14,000 barrels per stream day or 12,400 barrels per calendar day. In its first month of operation the unit handled 14,460 barrels daily.

The atmospheric column separates crude

Stabilizer column and clay towers, Ambes Refinery, France.



into a combined gasoline-naphtha stream, kerosene, two gas oil cuts and residuum. Operating on Abqaiq crude, current yields of specification products are about as follows:

Motor gasoline	26.0	Percent
Kerosene	1.0	"
Diesel fuel	20.0	"
Fuel oil	47.5	"
Plant fuel & loss	5.5	"

Normal yield of kerosene from Abqaiq crude is much larger than the present commercial results. A yield of about 12 percent could be obtained, but at present the market for kerosene in France is small, while the market for diesel fuel is active, so the light gas oil stream is being widened. By suitable blending of excess kerosene and the two gas oil streams with residuum, the plant is producing four grades of fuel oil to suit market requirements.

Overhead from the atmospheric column of the crude distillation unit is stabilized and subsequently rerun to produce light and heavy naphthas. Overhead from the stabilizer is burned as no facilities have been provided for LPGas production. Small quantities of LPGas are being produced in France, but the market is not yet developed to a point where the average refinery can justify production and storage facilities. The heavy naphtha from the rerun column is charged to a UOP reformer with a capacity of 3,200 barrels per stream day to improve the octane rating of finished motor fuel and minimize TEL requirements. Overhead from the reformate stabilizer is used as a plant fuel.

Abqaiq crude is light enough so that it is unnecessary to use any natural gasoline in the production of motor fuel. As a matter of fact, there usually is a surplus of butanes burned as plant fuel. Endpoint of the motor gasoline produced is held at a maximum of 410°F.

Under current French regulations standard motor gasoline is 70 octane number. In compliance with regulations the motor fuel is leaded to test 71 octane at the refinery. Lead usage is less than the French maximum of 1.89 cc per U. S. gallon.

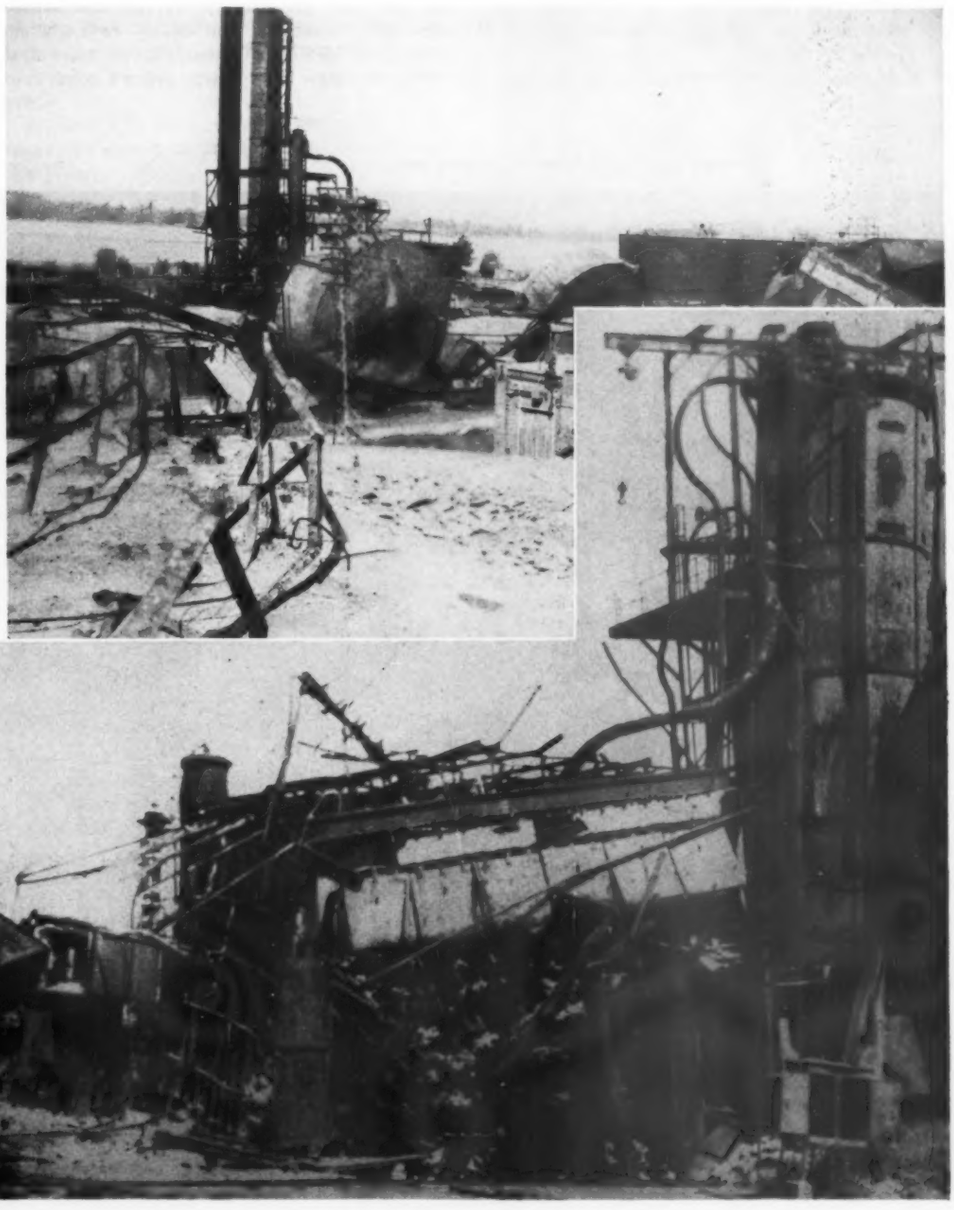
The UOP thermal reformer was designed to permit flexibility in reforming severity so that a wide range of octane requirements in markets of the future may be met. With the relatively heavy local demand for residual and diesel fuels, the original design anticipated that neither thermal nor catalytic cracking of middle distillates would be required. The French national market for principal petroleum products is roughly 38.8 percent residual fuel, 25.7 percent gas oil, 2.6 percent kerosene, 30.3 percent motor fuel and 2.6 percent lubricants. These percentages correlate closely with current plant yields as given above.

Motor fuel produced from Abqaiq crude presents no difficult treating problem. A 3,650-barrel per stream day lead sulfide plant sweetens both the light naphtha and gasoline reformate. A batch treater with a capacity of 380 barrels sweetens the kerosene.

Abqaiq crude contains about 1.3 percent sulfur, but like other Saudi Arabian crudes, is not classed as sour because of the stability and relative inactivity of the sulfur compounds. Light gasoline from Abqaiq crude tests about 63 octane by the motor method and is responsive to lead. Heavy naphtha before reforming tests about 37 o.n. and will lead to 60 o.n. with 3cc TEL. Reformate of 60 to 70 o.n. clear is readily produced, depending on severity of reforming conditions, and this reformate will increase about 14 octane numbers when leaded with 3cc. From the above it is clear that Caltex has considerable octane reserve capacity in the new refinery to meet any reasonably anticipated changes in market requirements.

Moderate alloy protection against sour crudes was built into the Ambes refinery. An alloy lining was applied in the flash section of the crude column and to the reformer column. Reformer vapor lines are 4-6 chrome, and reformer furnace tubes are 2.25 chrome —one moly high tensile steel.

Caltex has done much to attract a high quality of French worker to operate the new plant. A small village of 15 homes has been erected to house key personnel. A club and



Tank farm wreckage before reconstruction.

Bombed Dubbs unit as it appeared in 1947.

New cafeteria at lunch time.

cafeteria have been built. In the cafeteria the maximum current cost of a meal to employees is 45 francs.

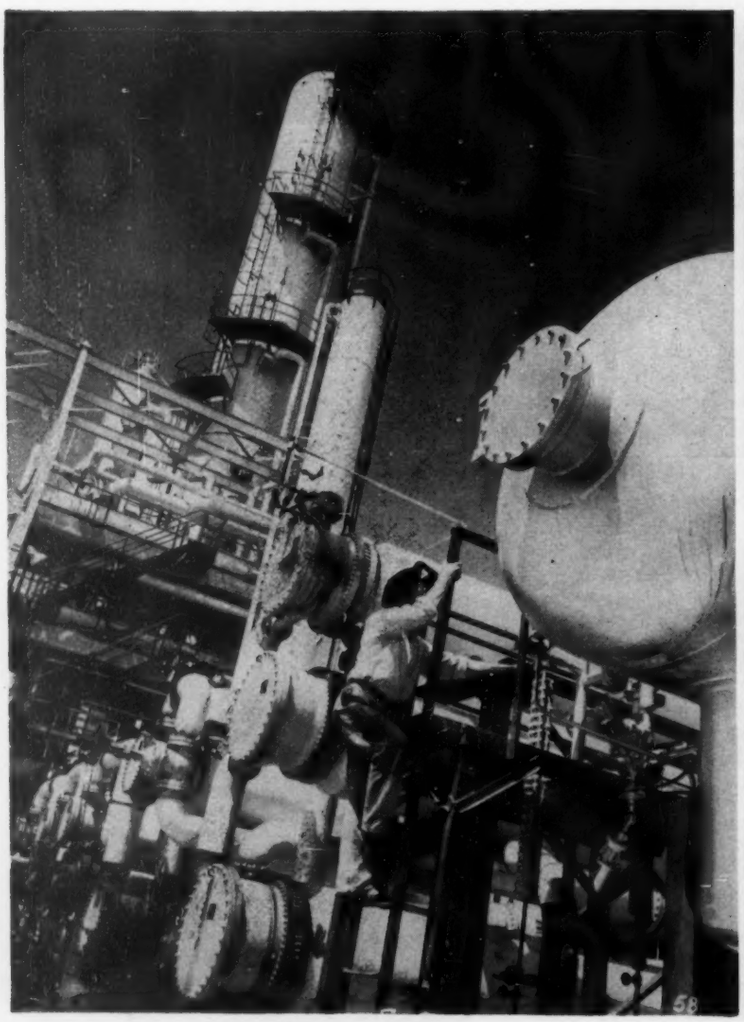
More than 450 heavy bombs were dropped on the prewar refinery during the Allied strategic bombing. In May, 1947, when Arthur G. McKee & Company's engineers first waded through high weeds, around bomb craters and piles of debris, twisted steel and wrecked tanks to estimate cost and time required to put all this wreckage back to work, they found grass growing on the bottom of oil tanks turned upside down and goats climbing around the reformer structure.

Late in 1947 the refinery reconstruction program was started. Clearing the site of bombs and debris was the first phase of the work, followed by the repair of usable equipment and finally by the actual new construction phase.

Just before actual construction work was started, all unexploded bombs were removed by the French military authorities. However, several 900-pound bombs were encountered during later grading work which were removed without exploding. One bomb went through the roof of a storage tank, penetrating the tank bottom without exploding, from where it was removed with great difficulty.

Analysis of materials left over from the bombing showed that considerable material, ranging from fractionating towers, tanks, pumps, exchangers, to pipe and valves could be reused after modification and repair. About $1,500,000 worth of equipment was then recovered and put back to work, while thousands of tons of rubble and steel was removed or salvaged as scrap.

Checking heat exchangers of topping unit.



At truck loading rack.

To fit in the salvaged material for reuse in a modern plant took careful planning; many towers were taken apart, inspected and changed and reused; same with pumps, motors and storage tanks. The power plant, having suffered the least bombing damage, was repaired first. The whole plant was practically taken apart and repaired and put back into service. Today the four boilers of about 120,000 pounds per hour total steam generating capacity are back on the line, and modern combustion control guides their operation. The 1,500 KVA turbogenerators were back in Western service soon enough to aid materially in the construction program.

In addition to the process equipment, a new water pumphouse, supported on reinforced concrete piles, capable of supplying 9,200 gpm of muddy Dordogne water to the plant, has been built. About 600 gpm of fresh water is supplied by artesian wells.

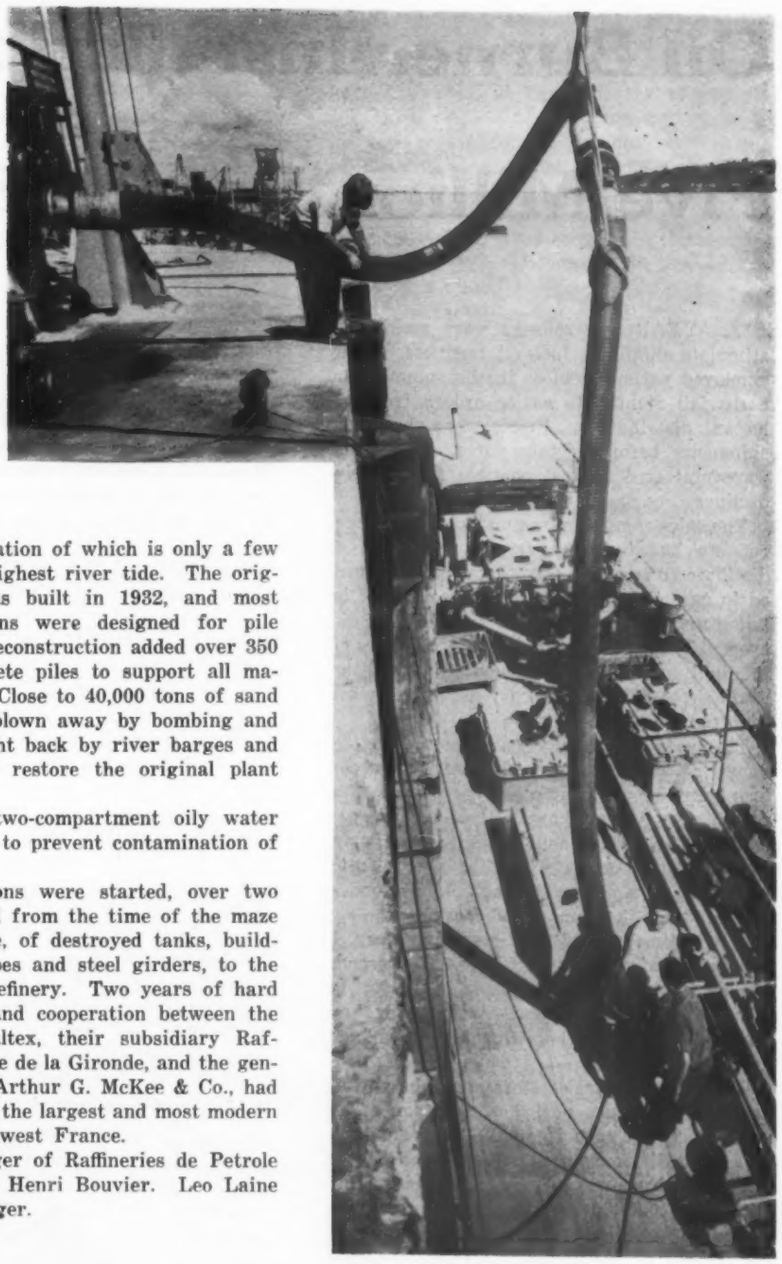
The yard piping required nearly 60 miles of pipe, a large part of which was made in Germany. Incoming Arabian crude oil is pumped to storage through a 14-inch line from the reconstructed public dock at the north of the refinery.

A peculiar design problem was met for sewers, yard piping and drainage due to the low flat sandy soil of very little bearing value, the average elevation of which is only a few feet above the highest river tide. The original refinery was built in 1932, and most heavy foundations were designed for pile supports. The reconstruction added over 350 reinforced concrete piles to support all major equipment. Close to 40,000 tons of sand fill was lost or blown away by bombing and had to be brought back by river barges and hydraulic fill to restore the original plant grade.

A new API two-compartment oily water separator serves to prevent contamination of the river.

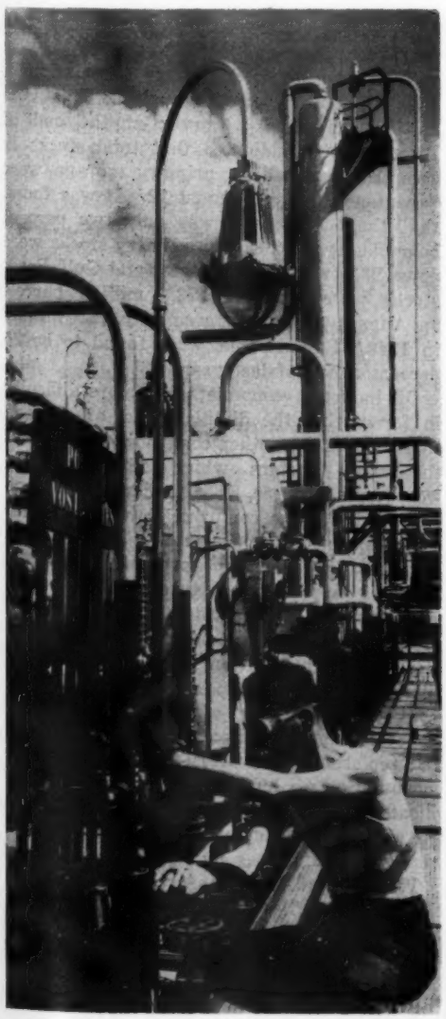
When operations were started, over two years had passed from the time of the maze of war wreckage, of destroyed tanks, buildings, twisted pipes and steel girders, to the modern Caltex refinery. Two years of hard work, devotion and cooperation between the engineers of Caltex, their subsidiary Raffineries de Petrole de la Gironde, and the general contractor, Arthur G. McKee & Co., had changed ruins to the largest and most modern refinery in southwest France.

General manager of Raffineries de Petrole de la Gironde is Henri Bouvier. Leo Laine is refinery manager.



At barge dock on the Dordogne River.

Sampling at treating unit.



Transfer pump station No. 1.

Oil Burner Installations To Pass Five Million Before End of 1950

A YEAR ago refiners were seeking to stimulate distillate fuel oil business. They employed various devices in the summer and early fall months to entice orders from reluctant distributors. Prices were shaded on shipments before certain dates, and buyers were protected against possible future price declines.

The sales campaign was undertaken because refiners had built up very large stocks of distillate fuels which they felt might be needed in case the winter should be severe. Distributors seemed to have no such fears, however. They thought there was enough oil in sight and ample transportation facilities available to deliver necessary quantities when required.

This year it has not been necessary for refiners to look for orders. Markets have been firm with an advancing tendency, and, as a result, distributors have felt it to be good business to operate on a high-stock basis. This was true even before the outbreak of hostilities in Korea. The conflict has tended to accentuate the summer-fill movement.

A sampling of fuel oil distributors Aug. 1 revealed that their stocks were 37 percent higher than on the same date in 1949. In addition the dealers reported that they had filled 59 percent of their consumers' tankage at that time.

Consumer and dealer storage can be an important factor in a period of shortage. The average storage capacity of the basement tank of a domestic consumer in the United States is not much more than seven barrels. But with 4,750,000 installations, the aggregate exceeds 32 million barrels, which is roughly ten percent of the annual domestic consumption of distillate fuel oil, diesel fuel and gas oil. In addition a recent survey of fuel oil dealer storage capacity conducted by *Fueloil and Oil Heat* magazine reveals an added tankage capacity of more than 24 million barrels.

Government reports do not provide a check on the volume of oil in dealer or consumer tanks, but clues may be seen in Bureau of Mines and American Petroleum Institute refinery reports to supplement spot checks such as the one mentioned above. In the months of April, May and June this year United States refiners shipped 51.7 million barrels of distillate fuels falling within Grades 1 to 4. In the same period in 1949 shipments of these grades aggregated 45.3 million barrels. Since refinery shipments in the second quarter of the year are not made in time for delivery and use by domestic consumers during the heating season, it may be assumed that the increased deliveries were largely for storage.

Domestic demand for distillate fuels in the first half year totaled 199 million barrels, compared with 165 million in the first half of 1949. In the same period that demand was rising 20.6 percent, refiners increased their output 10.9 percent from 163.7 million barrels in the first half of 1949 to 181.6 million barrels this year.

Distillate yields have been increased this year, returning to the 1948 level. Average in the first half was 18.5 percent of crude compared with 16.8 percent in the first half of 1949. In June last year the yield was 15.14 percent, compared with 18.38 percent in June 1950. API weekly reports covering the period since the last Bureau of Mines monthly statement show that production has not been cut back at any time during the hot weather.

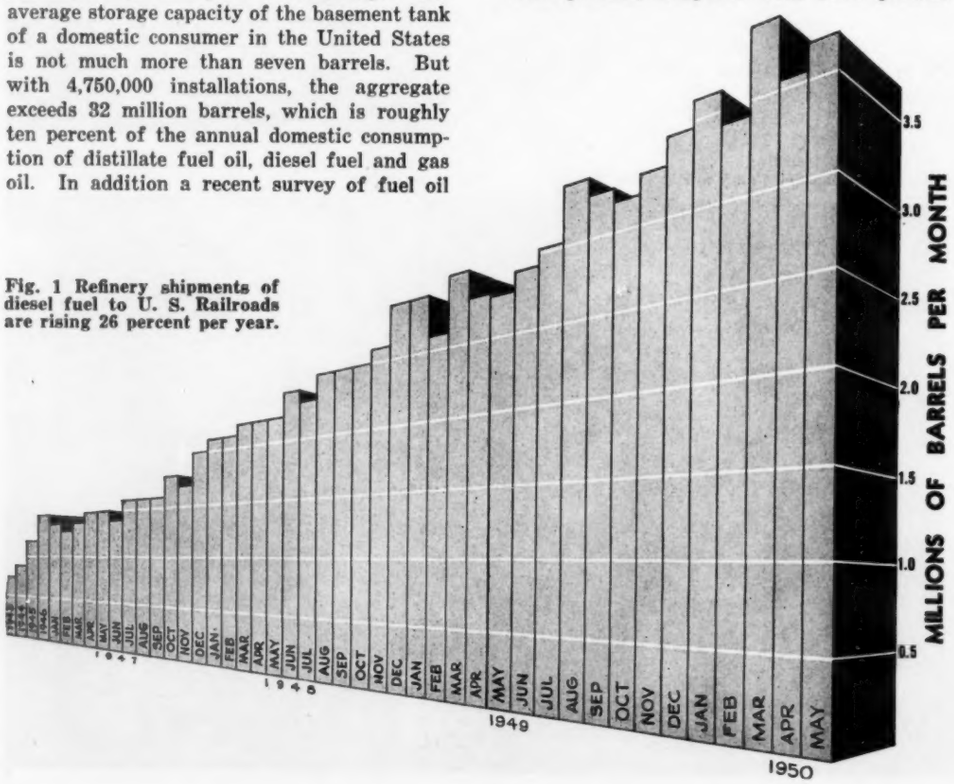


Fig. 1 Refinery shipments of diesel fuel to U. S. Railroads are rising 26 percent per year.

At the close of June stocks of distillate fuel oil at refineries and in pipelines and bulk terminals totaled 53.7 million barrels, compared with 64.7 million barrels on June 30, 1949. At the end of August, even with very high refinery throughput and high yields per barrel of crude run, refinery stocks still were 11 million barrels below last year.

With an aggregate capacity in dealer and consumer tanks of 56 million barrels, it may well be that total available supplies of oil as of the end of August were as large or larger than a year ago.

Concern is being expressed by some groups of distributors. The "ESPA" published by the Empire State Petroleum Association, in its August edition points out that the distillate picture is not encouraging in view of the anticipated increase in oil demand during the coming winter season and the low state of refinery storage.

The Independent Oil Men's Association of New England is not so disturbed. This association conducted a survey at the end of August which indicated that total stocks in secondary as well as primary storage were "about normal" on August 12. It was found that the overall total was only two percent below last year, although refinery stocks were down 23 percent. East Coast and Gulf Coast stocks were placed at 73.6 million barrels on August 12, as compared with 75.2 million in 1949. Summer fills were found to be 25 percent ahead of last year.

Oil industry economists find more difficulty in forecasting the distillate fuel oil demand than that of any other commodity because of the many factors which affect it. The weather, of course, is a major factor, and some of the larger companies have given some consideration to the desirability of trying out long-distance weather forecasting over a period of several years to see if it is practical. Other complicating factors are the growing use of the same crude fraction for diesel fuel, competition for the middle distillates as cracking stock and, at the burner level, the balancing of losses of installations to other fuels against new installations and replacements of worn-out burners. The consumption per burner factor is further complicated by increased burner efficiency and the greater tendency of home owners to avoid excessive heat losses by better insulation.

The railroad demand for diesel fuel is a factor of swiftly growing proportions. In 1949 there were 7,155 diesel locomotives on Class I railroads in the United States. Total deliveries of diesel fuel to railroads during the year was 36.5 million barrels or

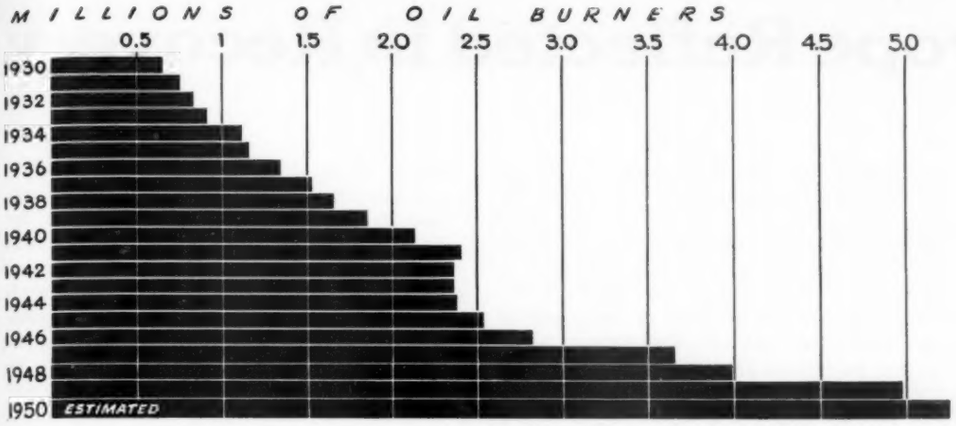


Fig. 2 Domestic oil burners in use at the end of each year with estimate for 1950.

about 5,000 barrels per locomotive. Deliveries were 27 percent higher than in 1948.

In the first half of 1950 railroads added 1,122 diesel locomotives to their fleets. Only five non-diesel locomotives went into service. Locomotives added in the six-month period will increase the oil industry's load by 5.6 million barrels annually. Diesel locomotives now on order will increase the fuel load for some years to come. Deliveries of diesel fuel to railroads in the first five months were 3.7 million barrels or 26 percent higher than a year ago, and 1949 deliveries were, in turn, 27 percent greater than those in 1948.

Until the war scare came along, the sale of domestic burners was booming at a record rate. In the first seven months installations were running 44 percent ahead of last year, according to *Fueloil and Oil Heat*. Estimates were that sales for the year would approximate 825,000. Of these about ten percent would be to replace worn out equipment, leaving a new addition to burners in use of about 750,000. At the close of 1949 burners in use totaled 4,490,000, and before the Korean trouble it was anticipated that usage at the end of 1950 would be about 5,240,000.

Normally installations of domestic oil burners are heavier in the fall months than in the spring and summer, so the year's total may be somewhat affected. About all that happened in July, however, was a big rush on the part of home owners to buy an oil burner and get it installed before a shortage could develop. July installations totaled 82,726, which was an astonishing increase of 68 percent over July 1949. Of the buyers, 5,899 were replacing worn out equipment, 56,182 were converting from other fuels, and 20,645 were installed in new homes.

Since the largest number of oil burner buyers normally are those converting from other fuels, it is always possible that changes in general economic conditions, the threat of a shortage of oil, or an actual shortage of burners or tanks may have a severe effect on total installations. In the first seven months of 1950, for example, conversions totaled 216,272 or 60 percent of the total. Only 138,000 were necessary replacements or new-home installations. At present consumers do not seem to be dismayed by the $400 to $500 average cost of converting a coal furnace to oil, nor are they afraid of an oil shortage. So the year's net gain in installations may reach the 750,000 as previously anticipated.

There has been a great deal of talk about loss of oil customers to gas, but thus far the figures do not alarm fuel oil dealers. In 1948 there was a loss of 29,743 customers to natural gas. Last year the loss to gas was 30,275, an increase of only 532. The maximum conversion from oil to gas probably lies in the future as new lines are completed. In the past five years the natural gas industry has spent $2,960 million in building new lines from field to market and expects to spend an additional $3,140 million in the next five years. The industry expects to add three million new heating customers to its present load of 7.2 million. How many of these will be at the expense of coal and how many at the expense of oil remains to be seen. The estimated added number of about 1,150,000 in the 1950-51 heating season appears to be very largely at the expense of coal and not oil.

In general it is estimated that the oil heating load during the coming winter will be about 20 percent greater than last winter. Part of this is based on a return to normal temperatures and partly to the increased number of burners in use.

Last year the average use of oil per installation was 1,682 gallons as compared with a prewar average for a normal winter of about 2,000 to 2,100 gallons. Consumption per burner according to *Fueloil and Oil Heat* is about a sixth less than before, due to greater burner efficiency, smaller homes and better insulation. A normal consumption per heating season is now estimated at about 1,800 gallons.

Assuming that consumption this year will be about 1,800 gallons or 43 barrels per burner, the home heating market for distillate fuels will approximate 225 million barrels. To supply this volume as well as diesel fuel and military needs, it has been suggested that the refining industry will have to build its yield to around 22 percent of crude run. The highest yield yet recorded by the refining industry in the United States was 20.14 percent in February 1948, during the most severe weather of a year in which transportation facilities were inadequate to deliver the right amount of oil to the right place at the right time.

The price incentive today is not great enough to persuade refiners to widen their middle distillate yields to anywhere near 22 percent. But the modern refinery has a good deal of flexibility built into it, and with the distributing industry cooperating by carrying a full pre-season storage, the industry should not get into too much trouble—if the weather man does his part.

Fig. 4 Yields of gas oil and distillate fuels have returned to the 1948 level this year but some observers think an even greater production will be necessary. →

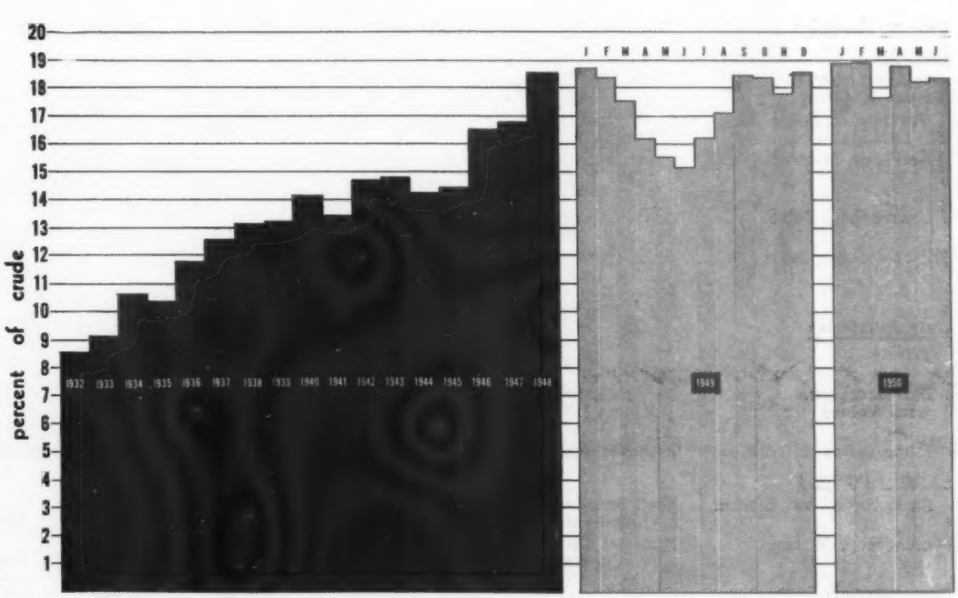
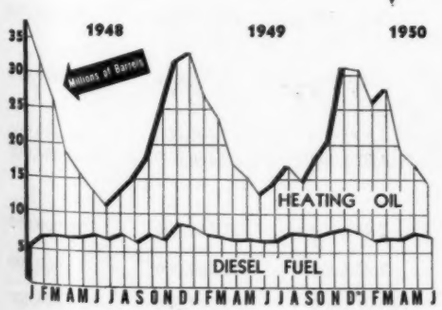


Fig. 3 Analysis of distillate shipments reveals the highly seasonal character of the fuel oil business as compared with diesel oil. ↓



Oil Aid to Europe Reflected in Recovery

A TRAVELER moving about Europe cannot fail to be impressed, not only by the extent of industrial recovery during the past two years but also by the evidence that, in the use of petroleum products, a new era of development has begun. To one familiar with prewar conditions the sight of a chugging tractor turning furrows on a French farm, the increasing number of diesel engines pulling railway trains or a visit to farm kitchens where cooking is done with butane, tell a significant story which is confirmed by statistics of production and distribution of fuel oils and other products.

Before the late war Western European refining capacity was on the order of 400,000 barrels daily. That of the United Kingdom was about 100,000 daily. The crude supply came largely from the Caribbean area, a smaller part from the Middle East.

The war itself cut deeply into refining capacity. One after another of Germany's plants was leveled, while others in France and Italy were so badly damaged that extensive or complete reconstruction was necessary before they could resume operation. Restoration of facilities was handicapped by lack of materials and lack of funds with which to purchase equipment.

When the Marshall Plan of economic aid to Europe was formulated, it was recognized that a fundamental requirement for industrial rehabilitation was a larger supply of petroleum products and additional refineries permitting a saving of costs by importing crude instead of manufactured products. Accordingly in the organization of the Economic Cooperation Administration in early 1948, a prominent place was given to petroleum, and it was estimated that 20 percent of its expenditures would be for oil and oil industry equipment. In a report submitted in August by the Petroleum Branch of ECA for the information of Congress, it was stated that authorized procurements for crude oil and products for the period April 3, 1948 to June 30, 1950, aggregated $971,500,000. Paid shipments for the same period amounted to $805,400,000. Of this $224,000,000 represented purchases from the United States, $302,500,000 from other parts of the Western Hemisphere, and $278,900,000 from the Middle East.

Authorizations for European refinery construction were $185,834,000. Of the total $155,917,000 represents dollar equivalents put up by the companies aided. Additions to refining capacity in the case of projects completed are 115,480 barrels per day. In some cases where no increase in capacity is shown, added facilities are devoted to lubricants or other specialties; in others construction is still in progress. There are also differences due to rearrangement of facilities for more efficient operation.

At the start of the ECA oil program the chief emphasis was upon getting products to the 16 European countries taking part in the plan. As immediate needs were filled, the emphasis shifted to getting refineries built. For this American know-how was called in to work side by side with European refinery experts. Under the Organization for European Economic Cooperation, a detailed pattern of refinery expansion for each country was worked out. The bulk of the capital invested in refinery restoration or construction has come from private sources. The policy has been to provide assistance of ECA only when special circumstances justified such action.

For refinery construction, ECA said, the labor, much of the materials and much of the assembling should come from local sources and be paid for from local funds. Thus, for most projects relatively little dollar aid was needed. But sometimes American designers, engineers and construction experts were needed and for such services payment in dollars was required. Sometimes compressors, alloy steels and other equipment had to be obtained from the United States. If so, and if ECA had given prior approval, then it stood ready to underwrite the part involving dollar cost.

This is the way it has been carried out. In the past two and a half years, a total of more than half a billion dollars has been spent to increase European petroleum refinery capacity. Much of this was financed independently of ECA. Some of it came from American companies which built or are building nine refineries or expansions, with a capacity of 175,000 barrels daily. Some of it came in sterling, francs or other local currency with no ECA aid.

In at least ten instances of new refineries or expansions, ECA furnished a minor part of the capital cost. In these projects, with an estimated total cost of about $170 million, the ECA supplied $30 million. The specialized and limited nature of ECA's capital aid has often been overlooked in discussions of its operations. On the more temporary phase of its program, the financing of crude oil and products to the various European countries, ECA has spent more than one billion dollars.

As a result of two years of effort to rebuild, the oil industry in Western Europe, largely through the efforts of private capital but sustained and guided by ECA, has mul-

(Please turn to page 64)

EUROPEAN REFINERY PROJECTS APPROVED FOR ECA FINANCING

Refinery Location	Company & Principal Affiliation	Throughput—Barrels Daily			Costs		
		Prior to Project	After Project	Net Expansion	ECA Dollars	Other Amounts	Total $ & Dollar Equivalents
France:							
Donges (near St. Nazaire)	Raffineries Francaise de Petrole de L'Atlantique (French)	8,000	16,000	8,000	750,000	8,685,000	9,435,000
Gonfreville, Seine & LaMede nr. Marseiles	Compagnie Francaise de Raffinage (French)	39,000 34,000	39,000 34,000	— —	6,000,000	15,000,000	21,000,000
Berre, nr. Marseilles	Compagnie de Raffinage Shell-Berre (60% Royal-Dutch Shell, 40% French ownership)	20,000	50,000	30,000	1,850,000	29,800,000	31,650,000
Gravenchon, Seine	Socony-Vacuum Francaise (Socony-Vacuum Oil Co.)	16,000	16,000	—	850,000	5,150,000	6,000,000
Port Jerome, Seine	Standard Francaise des Petroles (Standard Oil NJ, majority owner; also Gulf Oil, Atlantic Refining Co. & French ownership)	40,000	40,000	—	3,177,500	13,237,500	16,415,000
Italy & Trieste:							
Trieste	Aquila Spa Tecnico Industriale (Italian)	12,000	12,000	—	4,250,000	3,700,000	7,950,000
Port Marghera nr. Venice	Soc. Industria Raffinazioni Olii Minerali (51% Azienda Gen. Ital. Petroli; 49% Anglo-Iranian)	10,400	22,000	11,600	1,800,000	4,600,000	6,400,000
Rome, Milan & Genoa	Permolio Co.	4,800	5,800	1,000	1,534,000	3,450,000	4,984,000
United Kingdom:							
Shell Haven, nr. London	Shell Refining & Marketing Co. (Royal-Dutch-Shell)	8,000	46,120	38,120	2,455,000	31,545,000	34 000,000
Llandarcy, Wales	National Oil Refineries Ltd. (Anglo-Iranian Oil Co.)	20,000	46,760	26,760	7,250,000	40,750,000	48,000,000
TOTAL		212,200	327,680	115,480	29,916,500	155,917,500	185,834,000

Refinery Equipment

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SPECIFICATIONS!

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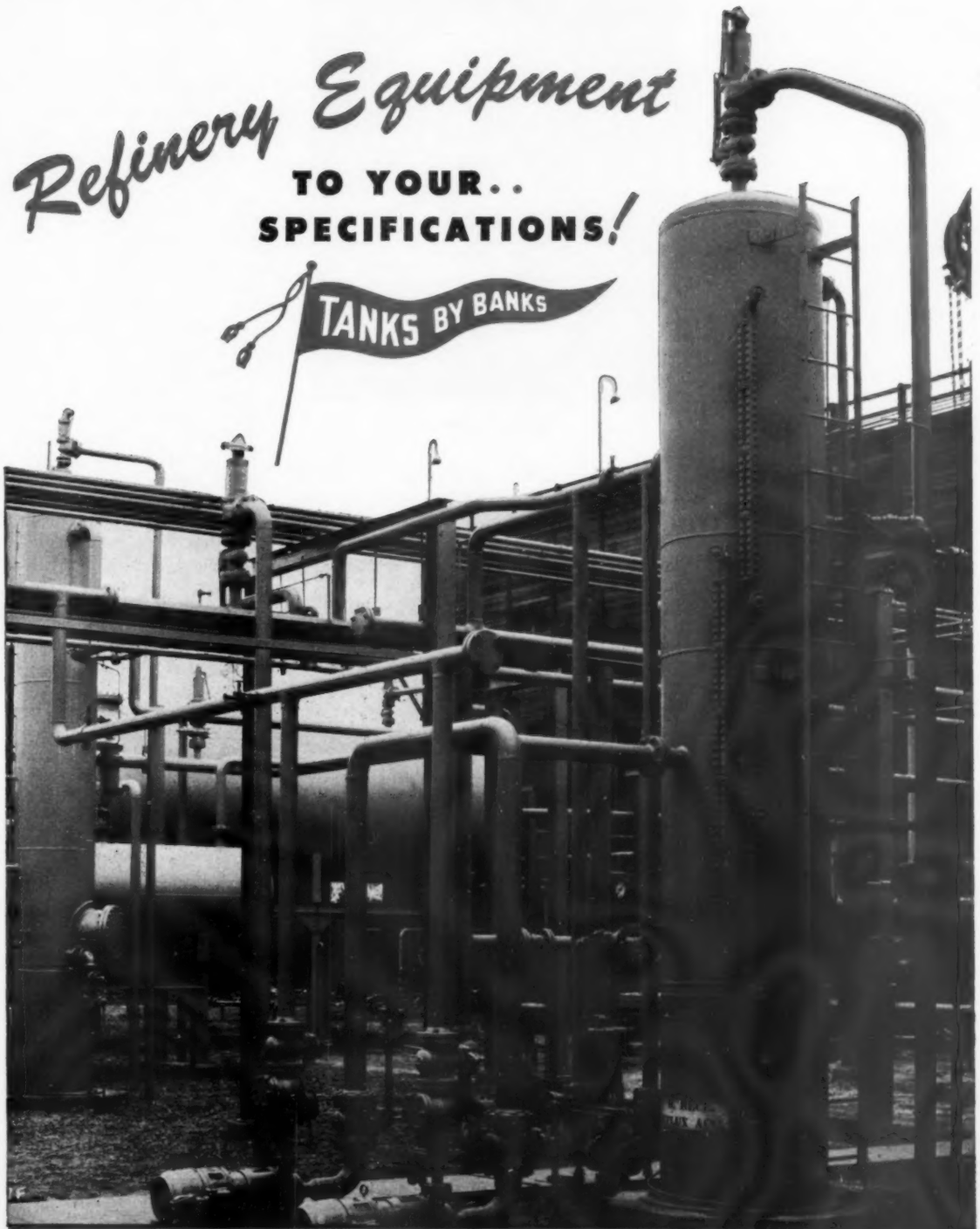

DALLAS TANK COMPANY, INC.

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DALLAS, TEXAS

Frank Phillips, An Oil Industry Leader

FRANK PHILLIPS, builder of one of the country's great oil companies and for many years a leading figure in the industry, died on August 23 at Atlantic City, New Jersey. His age was 76.

The career of Frank Phillips was typically American but unusual in many respects. He was born in Nebraska, but, while he was still an infant, his parents moved back to Iowa and settled on a farm near Creston. It was there that he spent his early years like many another country boy, attending the district school in winter and working on the farm in summer.

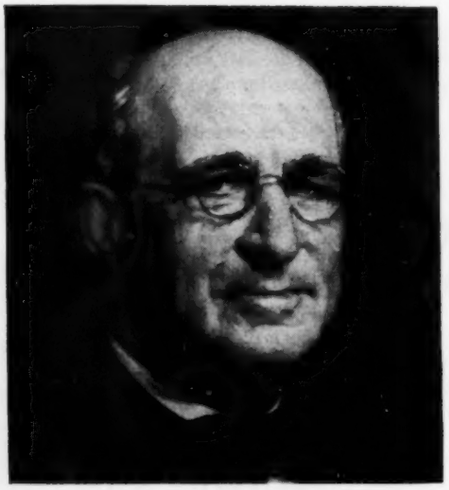
At the age of 14 he decided that town life offered more opportunities and greater attractions than the farm, and he went looking for a job in nearby Creston. The first opening that came his way was that of assistant to a local barber. It was there that he first displayed his business ability. By the end of ten years he had acquired the town's three barber establishments and combined them into what he proudly declared was the best barber shop west of Chicago.

At the age of 24 Frank Phillips married Jane Gibson, daughter of John Gibson, a Creston banker. On the advice of his father-in-law he sold his barber shop and spent the next few years selling bonds of companies in which Mr. Gibson was interested. In 1903 following the first spectacular oil discoveries in Texas and the midcontinent, he paid a visit to Bartlesville in what was then the Indian Territory, now the state of Oklahoma. The first discovery of oil within the present limits of that state had been made at Bartlesville in 1897 and the town boasted a fair-sized oil field. According to his own statement, young Phillips had come "just to look around," but evidently he was pleased by what he saw for he decided to stay. Within a few months he had acquired a few leases and drilled his first well. According to accepted reports it was a dry hole, but later attempts were highly successful, and in the next several years he drilled perhaps 200 wells, following the procedure of many small operators by buying leases, drilling wells and selling them.

Phillips Petroleum Company was organized in 1917, acquiring the personal holdings of Frank Phillips and his brother L. E., including some 80 wells producing 385 barrels per day. The first well drilled by the new company came in for 1,300 barrels per day, and by the end of 1917 its net assets had risen to more than $3,000,000.

From that time on the record of the company was one of rapid expansion. In 1920 when its shares were listed on the New York Stock Exchange, assets had risen to $34,000,000 and they have continued to multiply up to their present figure of more than $600 million.

In the first ten years of its existence the company had confined itself to the production of oil and natural gasoline, but in 1927 a program of integration was adopted with the acquisition of refining facilities and the establishment of a marketing division. Since then it has ranked among the strongest and most successful organizations in its field.



Frank Phillips

Frank Phillips held an unwavering belief in the future growth and usefulness of the oil industry. To develop its progress his company established a complete and thoroughly equipped research department which has contributed many valuable improvements to processing methods. Mr. Phillips himself, throughout his business career, was a strong progressive influence in the oil industry. His interests extended beyond that sphere, however, and included many philanthropic activities. He gave strong financial support to the Boy Scout movement and in 1944 established the Frank Phillips Foundation to carry on the charitable and educational work he had originated.

In 1937 Mr. Phillips resigned the presidency of the Phillips Petroleum Company, being succeeded by K. S. Adams, but continued his active interest as chairman of the board until failing health caused him to be named honorary chairman.

Italy Restricting Refinery Expansion

Milan

BASED on the declaration that oil refining capacity in Italy now exceeds the country's anticipated requirements for consumption in the immediate future, the Interministerial Committee in charge of petroleum affairs has laid down two general rules to be followed in granting permits for the erection of new refineries or the enlargement of existing plants. These are:

(1) To reduce to a minimum the issuance of building permits and, in cases where authorizations are issued, to give preference to applications from southern Italy and the islands of Sicily and Sardinia.

(2) In considering applications for enlargement of refineries, to give primary consideration to those which propose the rejuvenation of plants, the reduction of costs and the improvement of the quality of products, particularly in relation to the octane rating of gasoline.

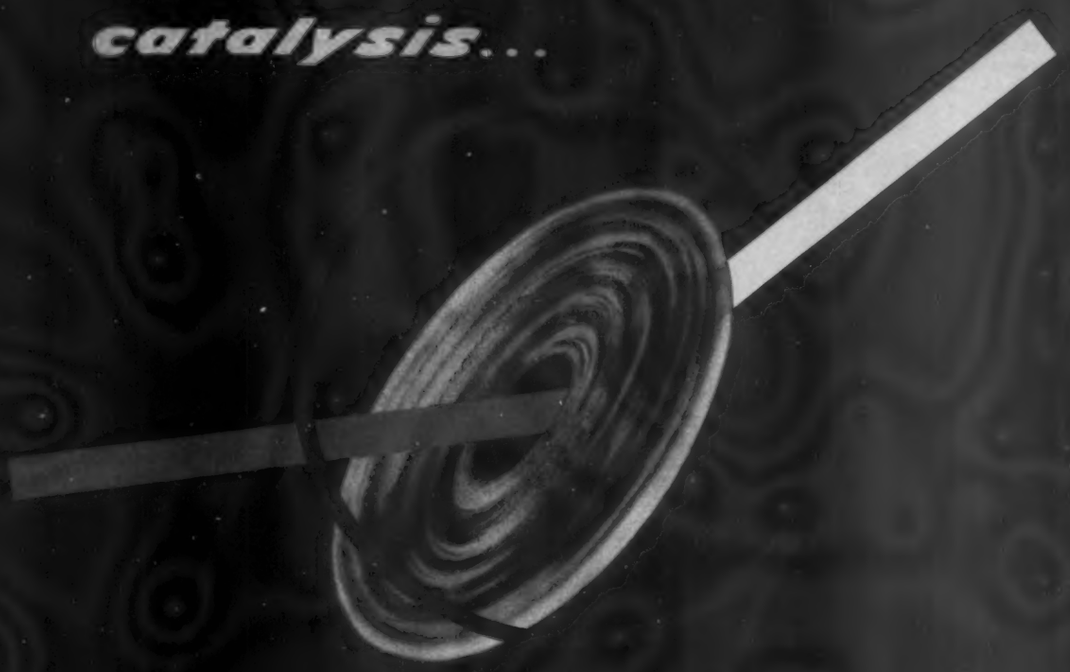
This is interpreted to mean in general that further applications for the construction of refineries will be rejected, although the committee itself recently has authorized the erection by Raffinerie di Petrolio "Italia" of a plant with a processing capacity of roundly 4,000 barrels daily to be located at Cremona, near Cortemaggiore and to be completed in 1953. Meanwhile, the Minister of Commerce and Industry has taken under consideration the application of CICSA to erect at Porto Nogaro (Udine), on the Adriatic coast between Venice and Trieste, a refinery of approximately 4,000 barrels daily capacity. It is intended to supply fuel oil to the industries established in the zone of Treviscosa, five miles east from Porto Nogaro, and to provide bunkering for inland waterway barges in northeastern Italy.

The restriction on new projects does not apply to those previously authorized or actually under way. For example, the Censoria Autonome del Porto di Genova has just approved the request of the Condor Company, which has a refinery in course of erection at Rho near Milan, with a crude oil processing capacity of 20,000 barrels daily; for the building of a pipeline 95 miles long from Rho to Genoa; and of an oil dock accessible to tankers up to 40,000 dw tons. The new oil dock will be a cooperative undertaking between Condor and the Permolio Company, which has a refinery already in operation in the Milan district between the Carlo Canepa mole and the Nino Ronco mole in the port of Genoa. The pipeline will be of 12-inch diameter, extending from the port to Fegino, ten miles from the sea, where Condor is to erect a coasting station with a storage capacity of 350,000 barrels. From Fegino the pipeline is to cross the Apennines in the Busalla zone, where a powerful pumping station will convey the oil to the Po Valley and to Milan.

Interest continues keen in the expansion of the gas industry. The Ente Nazionale Metano and the Azienda Metanodotti Padani are working to bring about the enlargement of the gas line system in the Po Valley, without which it would be impossible to ensure the sale of the quantity of natural gas (methane) produced in that zone. In July construction was begun on the Castellanza-Novara section of the Milan-Turin gas line, which can handle two million cubic feet of methane daily, and several textile mills in the Novara zone are converting their power plants from coal to methane. In September construction will be started on the gas line between Cortemaggiore and Tortona on the road between Milan and Genoa, which is to have a conveyance capacity of four million cubic feet daily of methane. This line is to be extended to the port of Genoa early in 1951 in an effort to supply home fuel to Italian vessels employed in coastwise trade. The Stabilimento Meccanico Ansaldo in Genoa has prepared for this purpose a new type of four-stroke methane gas engine with a maximum power of 600 hp.

It is expected that by 1953, through the exploitation of its methane resources, Italy will be able to reduce coal imports by 25-30 percent.

catalysis...



and engineering "know how"

—taking the catalysis out of the laboratory . . . out of the pilot unit into the refinery or chemical plant is a special function of the complete engineering and construction service—*Foster-Wheeler.*

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process units
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International news and notes

Third World Congress

In connection with the Third World Petroleum Congress which is to be held in The Hague May 28-June 6, 1951, a national committee representing the United States has been organized with the following officers: E. V. Murphree, Standard Oil Development Co., chairman; F. S. Clulow, Shell Oil Co., vice chairman; Paul D. Foote, Gulf Research & Development Co., vice chairman; K. G. Mackenzie, The Texas Co., secretary. Membership of the executive committee, in addition to the officers, includes Earl Bartholomew, Ethyl Corp., and W. F. Faragher, Houdry Process Corp.

Other members of the national committee appointed thus far are: R. C. Alden, Phillips Petroleum Co.; A. H. Bell; J. E. Brantly, Drilling & Exploration Co. Inc.; A. P. Frame, Cities Service Research & Development Co.; J. R. Keith, California Texas Oil Co.; C. G. Kirkbride, Houdry Process Corp.; L. L. Nettleton, Gravity Meter Exploration Co.; C. E. Reistle Jr., Humble Oil & Refining Co.; J. K. Roberts, Standard Oil Co. (Ind.); M. E. Spaght, Shell Development Co. Inc.; and H. G. Vesper, California Research Corp.

The committee is interested in bringing about adequate representation of the American oil industry at the Congress and the preparation of a considerable number of papers on technical subjects by members of the technical and research staffs of American companies. In order to provide for the proper listing and classification of papers already prepared and sent to the program committee at The Hague, the committee requests that the title of such papers, the author and, if possible, a brief synopsis be forwarded to K. G. Mackenzie, Secretary U. S. National Committee for Third World Petroleum Congress, 135 East 42nd Street, New York 17.

In the case of papers still to be completed, it is requested that similar information be supplied to Mr. Mackenzie who will be glad to supply anyone interested with a list of the master sections of the Congress along with certain prepared suggestions to authors.

The committee points out that presentation of a paper does not require personal attendance of the author at the Congress, but it is desired that the Secretary be informed whether or not personal presentation is contemplated.

J. R. White

J. R. White Appointment

Resignation of H. H. Hewetson as a director and chairman of Imperial Oil Ltd. and appointment of J. R. White as executive vice president were announced Sept. 1. Mr. Hewetson, who began his career in the oil industry at Imperial's Sarnia refinery following demobilization from the RAF after World War I, has been elected a director of Standard Oil Co. (N. J.) He was successively a director, vice president and president of Imperial and became chairman in 1949.

Mr. White entered Imperial's service at Sarnia in 1933 as a draftsman and engineer. He went to the United States in 1937, and in 1938 to the Standard Oil Co. of Venezuela, becoming a vice president of that company in 1942. In 1944 he returned to Imperial and was elected a director and a vice president in 1945.

Venezuelan Round-Up

Texas Petroleum Co. has bought out the inactive Coro Petroleum Co., thereby acquiring over 18,000 hectares in the state of Falcon, western Venezuela. The property includes the old Urumaco or Mamon field, where oil of 32 to 37° gravity was formerly produced from relatively shallow depths. Texas has also taken over from Creole Petroleum Corp. 151,000 hectares in Buchivacoa, Falcon.

Venezuelan Atlantic Refining Co. has announced that it will drill a wildcat to be called Barbacoas-1 in eastern Guarico, on a concession farmed out to the company by Creole Petroleum. Creole spent several million dollars to drill ten holes on this property without finding oil in commercial quantities.

The most recent new-field wildcat in Venezuela is Creole Petroleum's East Maron-1, about 10 miles west of Santa Barbara, which had drilled to 6,500 feet by early September. Mene Grande's northwest Caico Seco wildcat, CaXZ-101, was plugged and abandoned at 8,195 feet. Among other important wildcats, Atlantic's Guasare-1 was still testing in western Venezuela, while Ruiz-3-46, Cretaceous test in Guarico, was drilling ahead below 6,000 feet. British Controlled Oilfields' EM-285 was nearing 13,000 feet, while Shell's CQ-1, DMM-1 and DPE-1 continued drilling. Shell's Pueblo Viejo LB-273, bottomed at 14,746 feet, has been suspended for a month on account of high water. Sinclair's Guere-1, two miles west from Mene Grande's new Los Mangos field, began diamond coring at 7,470 feet, while at Texas' Mata-1 in Anzoategui, efforts were being made to set casing and sidetrack around the fish at 11,162 feet.

Meanwhile Mene Grande proved eight new pools in five wells in west Guara, Chimire and Santa Ana and continued drilling on its Cerro Pelado-1, two miles west of the La Ceiba field.

A total of 66 rigs were drilling new hole in Venezuela, 28 in eastern and 38 in western Venezuela. Ratio of exploration rigs to developments rigs was a little less than one to four—14:52.

Aubrey William Schofield

Aubrey William Schofield, 52, Gulf Oil official, was killed Aug. 31 in a plane crash in Egypt while enroute from Kuwait to New York. He had been acting manager of Kuwait Oil Co. Ltd. in the absence of L. T. Jordan, who was on vacation. Mr. Schofield was superintendent of drilling and production for the Mene Grande Oil Company's eastern Venezuelan fields before World War II. During the war he served with the U. S. Air Force, and upon his discharge as a Colonel in 1945, he returned to Gulf as a member of the executive department of the Houston production division. In 1946 he was appointed assistant managing director of the Kuwait Oil Co. Ltd., with residence in London. On Sept. 1, 1949, he became manager of eastern hemisphere operations, foreign production division, with headquarters in New York City.

J. W. Pertwee Retires

John W. Pertwee has retired after 26 years with the Shell group of companies. Included in his service was work in Venezuela, Mexico, Cuba and Colombia. He served as chief Shell geophysicist in the latter three countries before being transferred to headquarters offices in Holland.

Milton A. Dewey

To Supervise Canadian Tel Sales

Milton A. Dewey, who has served the Du Pont Company for 13 years in petroleum chemicals research and sales, has resigned to head a newly created tetraethyl lead sales department in Canadian Industries Ltd. He will be responsible for Canadian sales of Du Pont tetraethyl lead antiknock compounds and the company's other petroleum additives. His headquarters will be in Toronto with an additional office in Montreal. Before coming to Du Pont, Mr. Dewey was in charge of the analytical laboratory of the Gulf Research and Development Corp. and supervised a division of its additive research work.

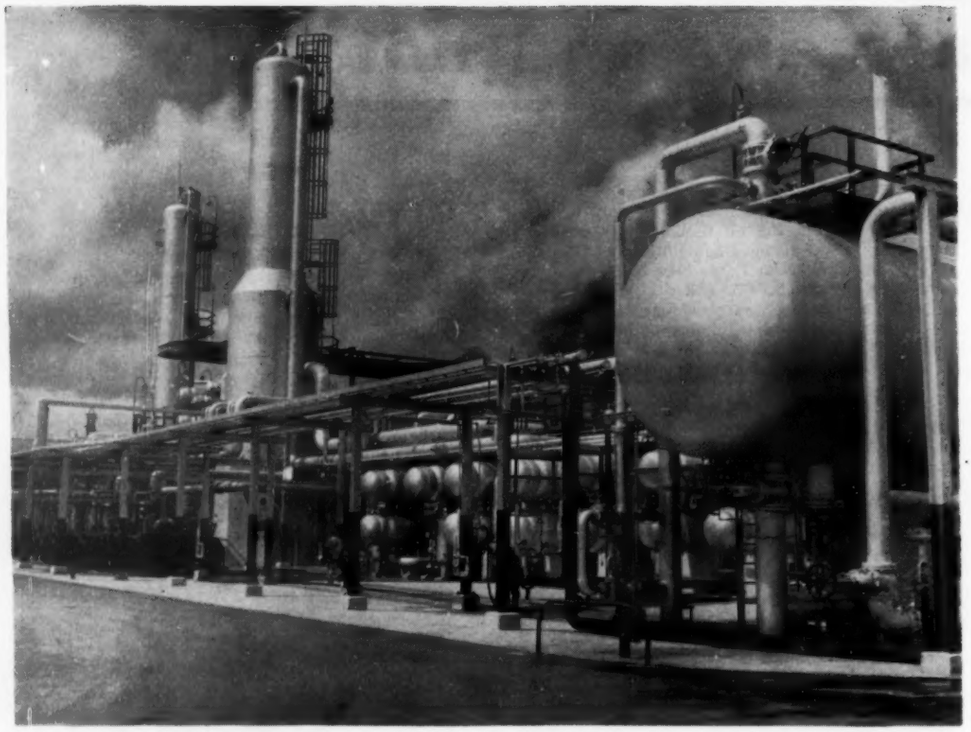
Recommends Expansion

The DeMares refinery at Barranca, Colombia, should be increased in capacity to 38,000 barrels daily and equipped with a combination topping and cracking unit, according to recommendations by the World Bank 14-man mission headed by Dr. L. Currie. The mission suggests that high gravity Barco crude be processed by reversing one loop of the Andian pipeline from the point of its crossing with the Sagoc line. To obtain maximum economy of operation, it is recommended that all refinery operations be centralized.

The Currie mission recommended that the government seek to stimulate more wildcatting because national reserves are too low. The study said that present reserves represent only a 10-year supply of oil.

British Motors for U. S.

Indication of the growing export of mechanical equipment from Britain to the United States is provided by the report of Newman Industries Ltd. of Bristol of a sale of electric motors to W. W. Grainger Inc. of Chicago, valued at $200,000. Mr. Grainger, the purchaser, described this as merely an initial order for immediate shipment and expressed confidence that it would be followed by more extensive sales.



Creole Petroleum Corporation's 10-million-cubic-foot natural gas plant at Jusepin, eastern Venezuela, built by C. F. Braun & Co. of Alhambra and placed in operation in September 1947. Braun will soon start work on a new pressure maintenance unit for this plant, which will bring its capacity up to 25 million cubic feet per day.

Creole Expands Natural Gas Facilities

A contract to be signed soon by Creole Petroleum Corp. and C. F. Braun & Co. of Alhambra, Calif., will result in more than doubling the capacity of Creole's natural gas plant at Jusepin, eastern Venezuela.

Under the terms of the $1.5 million contract, Braun will begin construction this year on a new pressure maintenance unit to be added to the present plant, also built by Braun, which went into operation in September 1947. The new unit, which will increase the designed capacity from 10 to 25 million cubic feet per day, is expected to be functioning by March 1951. The plant performs the functions of stabilization, desalting, dehydration as well as pressure maintenance by injection.

Creole's utilization of natural gas, which was 16.5 billion cubic feet last year, will rise to 21 billion cubic feet in future. Creole owns or has an interest in three other plants in Venezuela in which natural gas is utilized. The Mulata plant, jointly owned by Creole, Mene Grande and Pantepec, is identical with the present Jusepin plant in its functions. In addition Creole operates a pressure maintenance plant at Quiriquire and a plant at Cumarebo, western Venezuela, where liquid hydrocarbons are extracted from natural gas.

Bank Loan Paves Way to Mexican Oil Expansion

Ever since the close of World War II the question of a loan from the United States to Mexico that would enable the latter to carry out an elaborate program of oil development has been a topic of sporadic discussion. It has been the subject of diplomatic negotiations, of investigation in Mexico by representatives of the Washington government, of arguments in Congress and of numerous special reports.

Originally the request of the Mexicans was a loan up to $475,000,000, but this figure has been gradually whittled down as repeated rejections were encountered. Early proposals met a cool reception at the State Department, which held that it was against national policy to loan funds to a foreign government for this purpose, having in mind no doubt that it might set a precedent that would lead to many similar applications from other countries seeking to develop their resources along socialistic lines. Sentiment in Congress and among the public generally also seemed unfavorable.

First substantial support for the project to be presented in definite form came in 1948 from Representative Charles A. Wolverton, then chairman of the House Interstate and Foreign Commerce Committee, which had been engaged in studying the oil situation. Following a visit to Mexico, Mr. Wolverton prepared a 132-page report advocating an extension of credit, possibly up to the full amount requested. In several visits to Washington during the past year and a half, Senator Antonio J. Bermudez, head of Petroleos Mexicanos, the Mexican government's oil monopoly, has discussed the loan proposals, and other conferences have taken place between representatives of the two governments.

Technically the loan now authorized is not marked specifically for oil development. This apparently is a device to meet the objection of the Export-Import Bank to loans for foreign oil development where private capital is available. Herbert E. Gaston, chairman of the bank's board of directors, denied that the $150 million would be applied to oil projects, but he admitted that its effect might be to free other income of the Mexican government for such use. This accords with the statement given out by President Miguel Aleman in Mexico City.

Representative Wolverton, however, seems to regard the action as a victory for the advocates of financial aid to Mexican oil expansion. He said on the floor of the House that the loan "brings to a happy conclusion a long and bitterly fought battle against big interests in the United States," and added, "The United States will not directly finance the oil program but will make it possible by freezing revenues which otherwise would have had to go into road building and other domestic projects, if the United States funds had not been made available."

No information is forthcoming on the question whether promises reported to have been given that the extension of credit would lead to a liberalization of Mexico's attitude toward the admission of American oil companies to a share in Mexican operations. In his report Mr. Wolverton suggested that any loan to Mexico for petroleum development "be subject to an understanding that private oil companies be enabled to participate under reasonable terms such as there is indication presently are being worked out in current private negotiations."

Venezuelan Production

Venezuelan production continued to hover around all-time high levels. For the week ending Sept. 4, daily average production by companies was as follows:

Company	East	West	Total
Creole	133,417	534,886	668,203
Shell-Caribbean	—	477,892	477,892
Mene Grande	208,353	60,288	268,241
Texas Mercedes	30,080	22,473	52,553
Socony-Vacuum	38,371	—	38,371
Richmond	—	19,273	19,273
Ven. Atlantic	18,962	90	19,052
Pantepec	12,644	—	12,644
Sinclair	12,115	—	12,115
Phillips	7,621	—	7,621
B.C.O.	—	991	991
Totals	461,563	1,115,893	1,577,456

Production in Saudi Arabia

Crude oil production in Saudi Arabia during August amounted to 18,160,748 barrels, or an average of 585,831 barrels per calendar day, as announced by the Arabian American Oil Company. Crude processed at the company's refinery at Ras Tanura amounted to 2,791,476 barrels, or an average of 90,048 barrels per calendar day.

Crude oil production for the first eight months of 1950 amounted to 124,006,106 barrels, an average of 510,313 barrels per calendar day. Crude run in the refinery for the same period was 21,440,902 barrels, an average of 88,234 barrels per calendar day.

Death of F. C. Williams

F. C. Williams, manager of the Cardiff branch office of G. & J. Weir Ltd., Cathcart, Glasgow, died Aug. 19 in his 64th year. Mr. Williams commenced his apprenticeship at Cathcart in November 1902, and had much experience in marine fitting and repair work on the Clyde and in land installations in the Manchester area before he represented Weirs in South Wales and the west of England, where he was well known in engineering circles.

W. O. Twaits

Imperial Director

W. O. Twaits has been elected a director of Imperial Oil Ltd. He is one of the foremost authorities on petroleum economics in Canada. He joined the Imperial manufacturing department in 1933 and in 1945 was transferred to Toronto as assistant economic coordinator. Later he was appointed manager of the coordination and economics department, and in 1949 he moved to Calgary as management assistant in the western producing department.

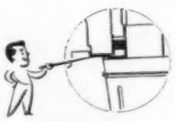
IN NO OTHER VALVE

So many features

and every one IMPORTANT!

POSITIVE ROTARY ACTION

Tapered plug, fully lubricated



RESILIENT SHOULDER STEM SEAL

Allows jacking of plug

CORROSION AND EROSION EFFECTIVELY RESISTED

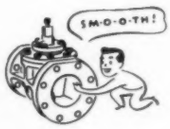
Lubricant pressure protects parts

INTERNAL LUBRICANT PRESSURE CAN BE GAUGED

Gauge can be directly installed

HYPERMATIC AUTOMATIC LUBRICATION SAVES TIME

Self-acting; self-feeding

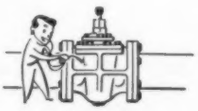


SMOOTH PASSAGEWAY

Streamlined, devoid of crevices

CAN BE "CRACKED" WITHOUT LUBRICANT LOSS

Lubricant will not blow out

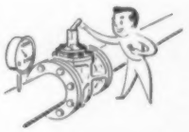


A TIGHT SHUT-OFF ALWAYS

Lubricant pressure maintains seal

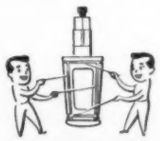
REPAIR PARTS AVERAGE ½ OF 1%

As compared with valve sales



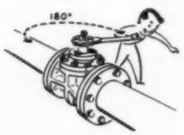
RE-LUBRICATED UNDER PRESSURE

Ball check valve holds pressure



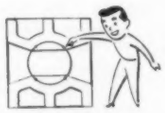
"SEALDPORT" SURROUNDS PORTS

Seals each port against leakage



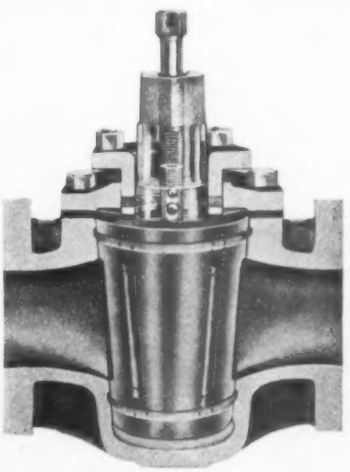
RENEWABLE SEAT WITHOUT REPLACEMENT

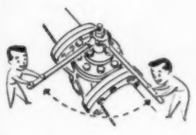
Plug can be re-positioned 180°



SEAT OF VALVE NEVER EXPOSED

Line fluid does not contact seat



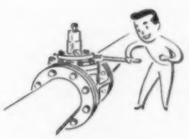


QUARTER-TURN

Simple sliding action

MOST COMPACT SIZES

Can be set in restricted space



ADJUSTABLE UNDER ANY PRESSURE

No need to shut down line

Audco-Nordstrom

BRITISH AMERICAN

LUBRICATED VALVES

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AUDLEY ENGINEERING COMPANY, LTD., Newport, Shropshire, England
Overseas Agents located in South Africa, Australia, India, Trinidad, British West Africa, Finland, Norway, Sweden, France, Belgium, Switzerland, Italy, Roumania, Spain and Portugal.

Oil company staff changes

FLOYD O. BRETT, division production superintendent for Sinclair Oil & Gas Co., Fort Worth, has been promoted to assistant general superintendent with headquarters at Tulsa. He will be assistant to F. H. Rhees, general superintendent, who has charge of all Sinclair Oil & Gas Company's producing properties. Mr. Brett was first employed by Sinclair in 1929 as a gas tester in Seminole. He served in various production posts in New Mexico and east Texas before being made assistant division superintendent at Fort Worth in 1942. He became division superintendent last October. He is succeeded at Fort Worth by Walter H. Crandall, who moves up from Midland, Texas.

J. H. Russell Ben C. Belt

J. H. RUSSELL, vice president of Gulf Oil Corp., has been placed in charge of crude oil purchasing and pipeline transportation activities of the company. He has been in charge of the Houston production division since 1944 and a company employee since 1921.

Ben C. Belt succeeds Mr. Russell as vice president in charge of Houston production activities. He has been in charge of Gulf's exploratory activities in the southwest for many years, having joined the company as a geologist in 1916.

W. L. HORNER has been named chief petroleum engineer for Sunray Oil Corp. production department. He was chief production engineer for the former Barnsdall Oil Co., now merged into Sunray. The new Sunray production engineering section combines the personnel of both companies into one department under Mr. Horner's direction.

J. F. Adkisson, Jr., has been designated supervisor of the department and is engineer in charge of the water flood section. Dr. Charles W. Ziemer is to be supervisor of reservoir engineering. Specialist engineers are R. K. Waddell, geological engineer; V. M. Williams, drilling mud engineer; W. H. Hagan, mechanical engineer; and W. P. Parker, salt water disposal engineer.

EWELL F. HINDMAN has been appointed general manager of the Louisiana Natural Gas Corp. For 20 years he was associated with Arkansas-Louisiana Gas Co. in various capacities, including operations, gas measurement and leakage engineering. He joined Louisiana Natural in 1949 as pipeline superintendent.

E. H. TODD, vice president of three wholly-owned Standard Oil Co. of California eastern subsidaries, was named president of Calmara Oil Co., marketer of Saudi Arabian crude and Venezuelan crude and refined products. Mr. Todd previously was vice president of Calmara. He is also president of Pocahontas Terminal Corp., a jointly-owned company with Pocahontas Fuel Co. Mr. Todd has worked for California Standard affiliates and subsidiaries for the past 34 years. He is also administrative vice president of The California Oil Co. and of California Refining Co.

L. E. TAYLOR of Maplewood, La., has been appointed manager of the East Chicago, Ind., refinery of Cities Service Oil Co. He succeeds John D. Snakenberg who was transferred to the manufacturing department of Cities Service at New York City. During World War II Mr. Taylor was superintendent of the government butadiene and toluene plant at Lake Charles, La., operated by Cities Service. He was transferred to the new Cit-Con Oil Corp. at Lake Charles as superintendent of operations in 1947. He held this position at the time of his transfer to the East Chicago refinery.

J. S. WORDEN has been appointed general manager of the refining department of The Texas Co. to succeed G. R. Bryant, who has been elected a vice president and placed in charge of Houston operations. Mr. Worden had been manager of operations in the refining department since 1942. He joined the company as a gauger in 1921 and served also at Houston, Texas, and Lawrenceville, Ill., before becoming operations manager.

W. B. Logan succeeds Mr. Worden as manager of refinery operations. He has been assistant since 1942. Mr. Logan's schooling was interrupted by service in the artillery in World War I. Following his graduation he joined The Texas Co. as a chemical engineer at Port Arthur, Texas. He became superintendent at Lawrenceville, Ill., in 1939 and a year later was transferred to Lockport in the same position.

In the general shifting of top refining personnel, F. H. Holmes has been made assistant manager of operations to succeed Mr. Logan. Mr. Holmes' early experience with the company was in producing and pipeline departments. Later he held supervisory positions in a number of Texaco refineries including those at Bordeaux, France; San Antonio, Texas; Bayonne, N. J.; and Lawrenceville, Ill. In 1943 he became superintendent of the Lockport works, and in 1945 general superintendent of Port Arthur works.

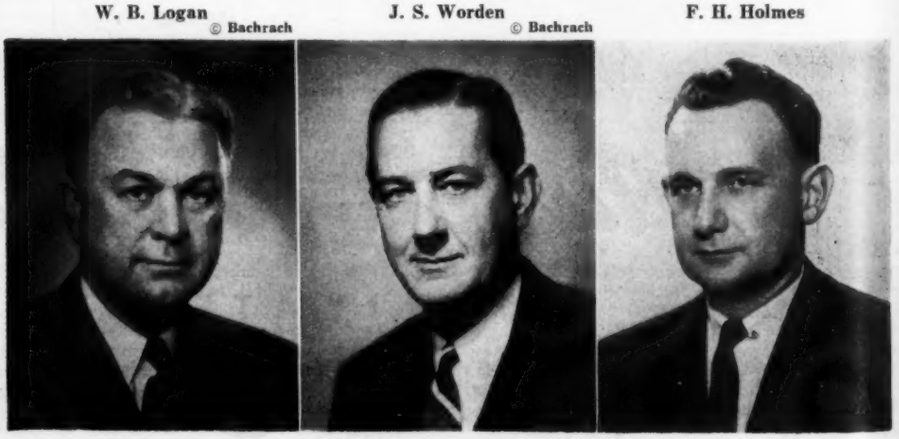
William T. Cravens

WILLIAM T. CRAVENS has been appointed general superintendent of refinery operations of Cities Service Oil Co. (Del.) He has been assistant general superintendent since June 1949. His early training was with Arkansas Fuel Oil Co. at Shreveport, La., and from 1942 to 1947 he was chief process engineer of Cities Service Refining Co., Lake Charles, La. Before his transfer to Bartlesville, he was chief process engineer of the manufacturing division of Petroleum Advisers Inc., New York City, a service organization of Cities Service Co.

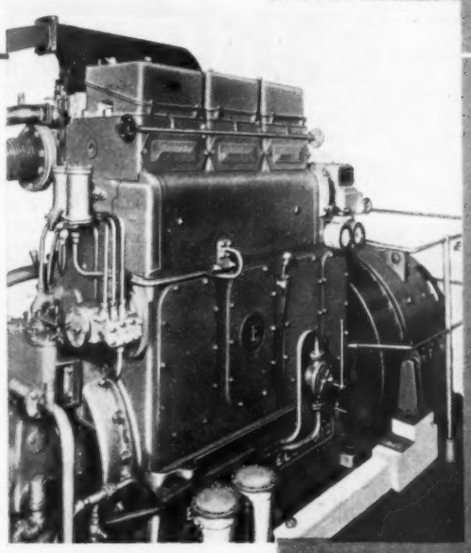
ROY S. REED has been named employee relations supervisor for Stanolind Oil and Gas Co. to succeed the late Homer L. Chapman. Mr. Reed joined the producing department in 1934 and later transferred to the industrial relations department.

JOHN D. SNAKENBERG, plant manager of the East Chicago, Ind., refinery of Cities Service Oil Co. (Del.), has been appointed assistant chief engineer of the manufacturing department, Cities Service Co., New York. Mr. Snakenberg was employed by Cities Service Oil Co. as job order clerk at the Ponca City, Okla., refinery in 1923. He was made superintendent of the East Chicago refinery in 1937 and ten years later was made plant manager.

W. B. Logan © Bachrach J. S. Worden © Bachrach F. H. Holmes



'ENGLISH ELECTRIC'
DIESEL ENGINES

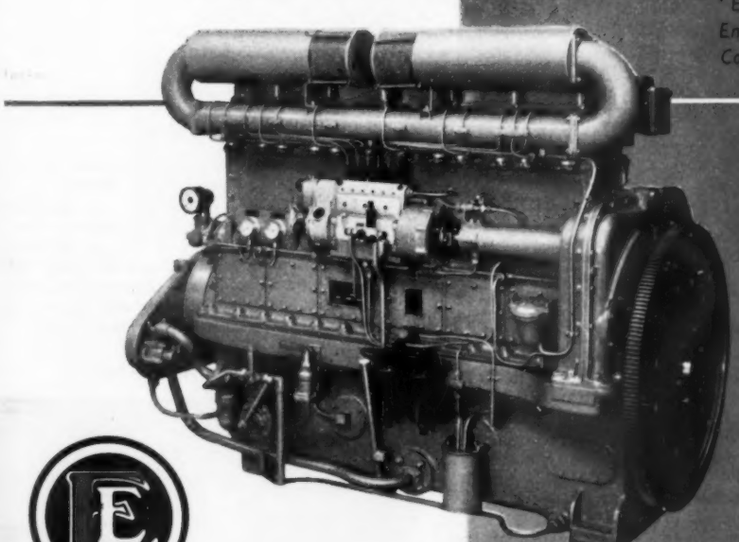


DUAL-FUEL ENGINES

'ENGLISH ELECTRIC' DUAL-FUEL ENGINES ARE AVAILABLE WITH OUTPUTS RANGING FROM 150 B.H.P. UPWARDS

The illustration shows a three-cylinder dual-fuel engine of 165 B.H.P.

Full details of the complete range of 'ENGLISH ELECTRIC' Diesel and Dual-Fuel Engines can be obtained on application to the Company's Diesel Engine Division at Rugby, England



DRILL-RIG UNITS

'ENGLISH ELECTRIC' SIX-CYLINDER NATURALLY-ASPIRATED DIESEL ENGINE FOR POWERING AN OIL WELL DRILLING RIG UNIT.

THIS ENGINE HAS AN OUTPUT OF 200 B.H.P. AT 1300 R.P.M.

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Fred Whittaker

Whittaker Joins Universal

Fred Whittaker has joined the staff of Universal Petroleum Co., Tulsa, as sales consultant. Mr. Whittaker formerly was president of Omar Refining Co. and is well known among petroleum refiners and marketers in the middle west.

JAMES W. McCOLL has been appointed assistant superintendent of the land department of Cities Service Oil Co. (Del.) Mr. McColl, who has been a member of the legal department of Cities Service since 1946, was formerly employed as a land man in the Illinois oil fields and worked in the Bartlesville office of the land department before he was called to war service in 1941. During World War II, Mr. McColl served overseas in the Sixth Army and rose to the rank of Major.

T. A. MANGELSDORF has been appointed general superintendent of the Port Arthur refinery of The Texas Co. He was transferred to the new position from Lockport, Ill., where he has been superintendent for the past three years. Mr. Mangelsdorf joined the company in 1933 at Port Arthur after resigning as assistant professor of fuel engineering at Massachusetts Institute of Technology.

Howard S. McCray succeeds Mr. Mangelsdorf as superintendent at Lockport, being promoted from the same position at Lawrenceville. He joined the company in 1926 and has been superintendent of Texaco plants at Sunburst, Mont., and Amarillo, Texas, as well as at Lawrenceville. He is succeeded at Lawrenceville by H. A. Lord who also served at a number of company refineries before being made assistant superintendent of the terminal division in 1948.

T. A. Mangelsdorf

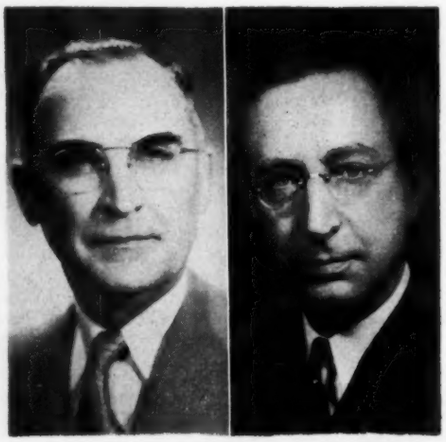
© Bachrach

EDWARD F. MORRILL has been elected president of the Mid-Valley Pipeline Co., succeeding William C. Kinsolving who was elected chairman. Mr. Morrill has been a vice president of Mid-Valley since the organization of the company in August 1949.

Mr. Kinsolving announced the transfer of company headquarters from St. Louis to Longview, Texas, on Oct. 1. Started last fall, the Mid-Valley's 1,000-mile pipeline from Longview, Texas to Lima, Ohio, is now nearing completion. Built at a cost of approximately $56 million and owned jointly by Sun Oil Co. and The Standard Oil Co. (Ohio), the line will have a capacity of 150,000 barrels of crude oil a day.

C. J. GARDNER, assistant superintendent at Sinclair's East Chicago refinery, has been transferred to the Wellsville, N. Y., refinery as assistant superintendent. Mr. Gardner, who was formerly superintendent of Sinclair's refinery at Coffeyville, Kan., succeeds C. W. Hardell, who is returning to Houston to prepare for reopening of the Sinclair rubber plant which has been shut down since September 1946.

George A. Blaine who has been in charge of the technical department at East Chicago, has been appointed assistant superintendent, succeeding Mr. Gardner. L. R. Bunger, formerly assistant to Mr. Blaine, will head the technical department at East Chicago.



E. W. Adams E. W. Thiele

Research Department Changes

A number of organizational changes have been announced for the research department of the Standard Oil Co. (Ind.) E. W. Thiele and E. W. Adams were made associate directors of research, and eight others were named to the newly created positions of division director. The title of assistant director of research was abolished.

The eight division directors and their fields of activity are: A. L. Conn, pilot plants; J. B. Duckworth, automotive; Nathan Fragen, chemical products; C. M. Loane, lubricants; J. E. Seebold, process design and economics; B. H. Shoemaker, exploratory studies in connection with major products; E. B. Tucker, analytical research; P. C. White, fuels and special products.

R. C. Mallatt was made chief chemist of the Whiting refinery. Newly appointed section leaders are H. R. Taliaferro, L. W. Mixon and W. R. Hertwig. New group leaders are R. W. Watson, C. W. Brackin and R. L. Yahnke.

Heads Supply Company

Charles B. Caldwell, a young Texan who was with Hughes Tool Co. for 13 years, has been elected president of Harrisburg Sales & Service Inc., Houston. Mr. Caldwell joined Hughes Tool in 1937 and advanced steadily with that firm until resigning to accept the presidency of Harrisburg. He has been an active member of the Dallas-Fort Worth chapter of Nomads.

J. R. Bailey

J. R. BAILEY, former assistant director of natural gasoline and gas operations for Continental Oil Co., has been promoted to director to succeed F. B. Haverfield, resigned. C. L. Ritter, former superintendent, natural gasoline and gas operations, becomes assistant director.

Mr. Bailey joined Continental in 1927 in the Glenrock, Wyo., refinery and in district engineering work in Louisiana. He moved to Ponca City, Okla., in 1942, became superintendent of development in 1947 and assistant director in 1949. He moved to Houston early this summer when executive offices were transferred there.

DR. GUSTAV EGLOFF, director of research, Universal Oil Products Co., Chicago, has been elected a Fellow of the Royal Society of Arts of Great Britain.

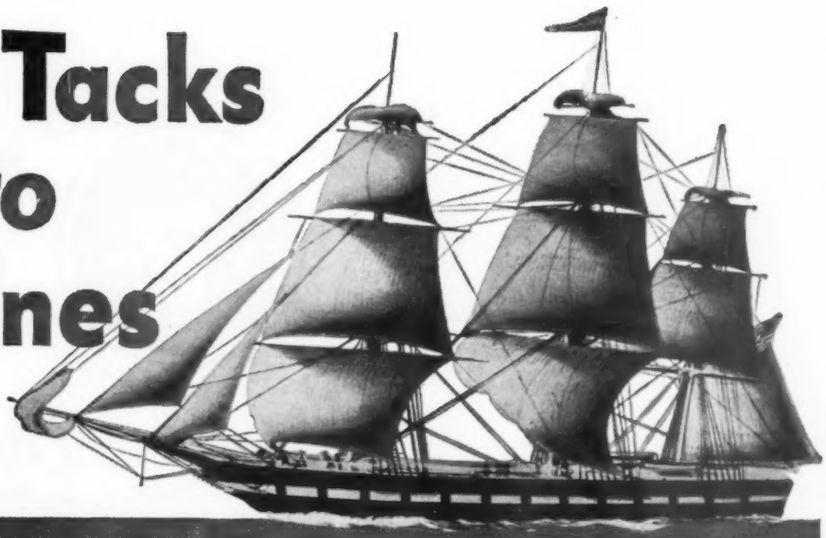
BENEDICT SAURINO, manager of the statistical research department, Sun Oil Co., Philadelphia, was appointed by Governor Duff of Pennsylvania to head up a 15-member state economic research council to help guide the state in peace or war. Mr. Saurino a month ago was appointed chairman of the Committee on Business Statistics, United States Chamber of Commerce.

Glespen Heads Cyanamid Catalyst Sales

The industrial chemicals division of American Cyanamid Co. has appointed Gerald L. Glespen as supervisor of catalyst sales in the petroleum chemicals department. Mr. Glespen, who joined the company in 1945, has been a technical field representative covering the Gulf Coast area for the petroleum chemicals department since 1948. Howard E. Nehms will continue as manager of the petroleum chemicals department.

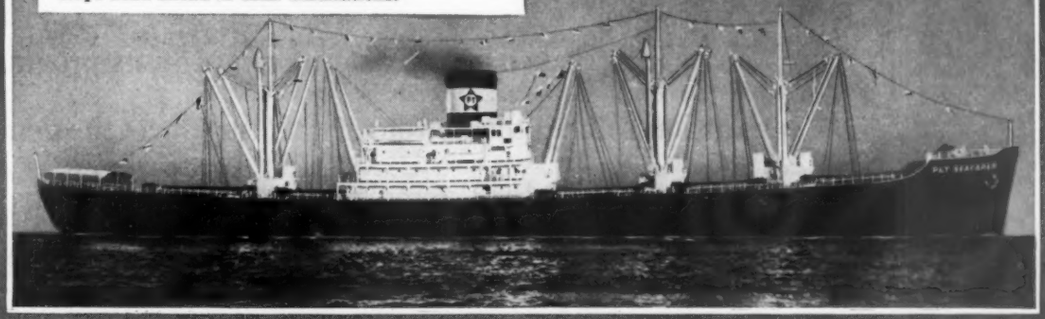
Gerald L. Glespen

From Tacks to Turbines



Petroleum Progress serves the Marine Industry

Not so long ago sailing ships were at the mercy of wind and weather. Wind-seeking tacks took ships the long way 'round. Today, thanks to petroleum, giant turbines drive passenger and cargo laden ships dead ahead to their destinations.



The American Merchant Marine, born in 1607, grew to an all-time high in 1945, operating more than 25 million gross tons. Throughout the world, specialized marine fuels and lubricants help maintain this essential, economic lifeline.

OIL beats the wind! Sails were augmented by paddle wheels and then propellers. Wooden ships were replaced by ships of iron and steel. Huge turbines now furnish power, speed and dependability.

At ports around the world Texaco fuels and lubricants are taken aboard, relied on for economical, efficient, on-schedule operations.

The marine industry has always been a major force in building and defending America. Petroleum research has contributed mightily to this vital maritime network of shipping and transportation.

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Cyanamid Vision s

New Aerocat® Catalyst Production Plant Spearheads Cyanamid Expansion

Cyanamid has taken another step forward in its program of continued expansion to help the petroleum industry meet the demand for greater production of higher octane fuels. At Michigan City, Indiana, work has begun on a new plant to produce microspheroidal synthetic fluid cracking catalyst.

The increased capacity of this plant is representative of the long-range vision that has maintained Cyanamid leadership since the inception of the fluid catalytic cracking process. And such vision is still at work every day at Cyanamid...ready to help you solve your catalyst problems.

on spurs catalyst progress

Cyanamid 1st in Development... American Cyanamid research pioneered many of the "first facts" about fluid catalysts. That pioneering still goes on. *Today* it brings you a variety of highest quality fluid cracking catalysts, headed by AEROCAT MS Grades of microspheroidal synthetic fluid cracking catalyst. *Tomorrow* it will work toward the development of catalysts with even greater catalytic cracking efficiency.

Vision, Experience, Facilities, Service... is the combination that enables Cyanamid to produce better chemicals for the petroleum industry: AEROLUBE® Additives for motor oils... AERO* Specialty Catalysts for chemical processes... Gasoline Dyes and Drilling Mud Chemicals. To learn more about these products and how they can help you...

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Lee Allen Swem

Heads International Division

Foster Wheeler Corp. has appointed Lee Allan Swem as vice president in charge of the newly formed international division. The new division will be responsible for foreign business of the corporation and will coordinate the activities of subsidiary companies in Canada, England and France. Mr. Swem joined Foster Wheeler in 1936 as patent counsel and was elected vice president in charge of the legal department in 1948.

J. MURRAY WILLIAMS has been appointed general manager of foreign producing activities of Atlantic Refining Co. For the past several years he has been managing Atlantic's producing operations in Venezuela, making his headquarters in Caracas. Mr. Williams succeeds C. F. Ford, who will assume new duties in Atlantic's domestic crude oil production department in Dallas, Texas.

WILLIAM D. LEWIS has been advanced to senior geologist with the General Petroleum Corp. at Bakersfield, Calif. He joined the company in Los Angeles as an assistant geologist in 1945 and became a member of the Bakersfield office in 1948.

E. W. McNEALY has been appointed assistant superintendent of The Texas Company's new Eagle Point works at Westville, N. J. Mr. McNealy, a native of Texas, began his career with The Texas Company as a summer employee at the Port Arthur, Texas, refinery while attending Rice Institute. For a number of years he served at San Antonio and Los Angeles refineries as a process engineer and in the managerial office of the refining department in New York. In August 1949 Mr. McNealy was appointed assistant superintendent of the Casper, Wyo., works, which position he held at the time of his recent appointment.

E. W. McNealy

Ethyl Decentralizes Sales

Nationwide decentralization of its sales activities is being put into effect by Ethyl Corp. under a new plan of organization announced by Sanford M. Wagner, vice president in charge of sales. The new plan includes the appointment of resident managers in each of the major cities where the company maintains sales offices. Staffs will be under the direction of Julian J. Frey, who is appointed manager of sales operations, and James E. Boudreau, who has been named manager of sales marketing. Russell B. Weston continues as advertising manager and Harry Kuhe as manager of chemical sales.

Louis W. Shank, formerly operations manager for the southern region, has been appointed assistant to Mr. Wagner at New York, while Malcolm P. Murdock succeeds Mr. Boudreau as manager of the central region. Richard C. Murphy, Harold R. Berg and Meredith Littlefield continue as managers of the eastern, southern and western regions respectively.

Oscar B. Lewis was appointed general manager of Ethyl Antiknock, Ltd., Canadian sales subsidiary, to succeed William M. Turnley who is retiring.

Supply Firm Official Dies

Sidney B. Iverson, 42, Iverson Supply Co. official and member of a pioneer Tulsa family, died of a heart ailment at Midland, Texas, August 7. He had suffered an attack of coronary thrombosis about a year ago. Mr. Iverson joined the supply firm, then known as the Iverson Tool Co., in 1928. It had been founded two years earlier by his father, the late P. M. Iverson.

New Search in Eastern Pakistan

Burmah Oil Co. is preparing to drill a test next year at Patharia, in the province of East Bengal, Eastern Pakistan. A diesel-powered drilling rig capable of going to 7,500 feet will be used.

Two previous test wells were drilled in the Patharia forest area before the war. One produced some oil but subsequently got into difficulties and had to be abandoned. The other was a dry hole. Further operations were suspended owing to the wartime moratorium on prospecting which did not expire until September 1948. Operations planned after that date were held up pending the resolution of the boundary between East Bengal and the Indian province of Assam. The new operations will be carried out in accordance with the Pakistan Petroleum Rules, issued in September 1949.

New Tropical Concession

Tropical Oil Co. has taken a concession on the 120,000-acre Balsamo block in the Magdalena Department about 50 miles south of Barranquila, Colombia. In the past 14 years Tropical has tested nine government concessions without success.

Canadian Consumption

Consumption of liquid fuels in Canada in the first quarter of 1950 totaled 24,426,880 barrels, according to the Dominion Bureau of Statistics. This was an increase of 21.3 percent over the first quarter of 1949. Domestic consumption data on lubricants, asphalt, coke and LPGas have not yet been assembled.

Output of finished products at Canadian refineries increased 17.8 percent in the first quarter to 21,014,884 barrels. Imports of refined oils decreased 131,425 barrels to 2,070,694 barrels, as compared with the corresponding quarter a year ago.

Opens Redwater Store

National Supply Co. Ltd. has opened a new store at Redwater, Alberta. The Redwater field has about 600 producing wells with 300 more expected in the near future. The new store will stock a complete line of production equipment and will have a shop for repairing and servicing downwell pumps.

James H. Pipkin

JAMES H. PIPKIN, former assistant to the chairman of The Texas Company, has been named general manager, industrial and public relations. He succeeds James Tanham who recently retired. Mr. Pipkin joined the legal department of Texaco in 1934. He participated in handling the legal phases of labor matters in the southwest before being transferred to New York in 1941 as assistant to the executive vice president. His new duties will include supervision of the company's personnel department, public relations department and health division. He will be chairman of the industrial relations policy committee and the committee on employee benefits plans.

ROBERT M. HUNT has been appointed supervisor of lubricating oil and wax manufacturing operations at the Bayonne, N. J., refinery of the Tide Water Associated Oil Co., according to an announcement by General Superintendent George C. Caine. Mr. Hunt started with Tide Water in 1946 as a process engineer, and in 1947 he was promoted to technical assistant to the process superintendent.

SSC Organizes New Division

Seismograph Service Corp., Tulsa, Okla., has added gravity and magnetometer service to the numerous other worldwide geophysical exploration services offered by the company and its affiliates. Richard A. Pohly has been named manager of the new division. Mr. Pohly comes to SSC from United Geophysical Co. where he served as manager of domestic gravity surveys. For the past five years he has specialized in reef interpretation of gravity data, the general theory of which was outlined in a paper he presented to the SEG section of the 1950 AAPG convention held in Chicago.

Richard H. Pohly

Death of Harry C. Hanszen

Harry C. Hanszen, for many years an active figure in Gulf Coast oil activities, died at Kerrville, Texas, August 26. He entered the oil industry in 1906 as a clerk in the employ of Gulf Oil Corp., soon afterward became an oil scout and rose through various managerial positions to become a vice president in charge of field operations at Beaumont and Wichita Falls. He was in charge of the company's interests in Mexico during the exciting days of the revolutionary disturbances.

In 1921, in company with James Gardiner of Lake Charles, La., and other associates, Mr. Hanszen organized the Calcasieu Oil Company which operated over a wide area in southern Louisiana. He continued his activities as an independent operator and as a director in various producing companies.

Transfers Division Offices

Headquarters of the eastern division of Western Geophysical Co. of America have been transferred from Natches, Miss., to Shreveport, La., according to Henry Salvatori, president. The division is under the direction of Booth B. Strange, vice president, who first joined Western Geophysical as a computer in Texas in 1936. In the meantime, he has seen service in practically every state in the country.

New Pipeline Valves

A new line of Class 600 cast steel pipeline gate valves is announced by Crane Co. The new conduit type valves are available with either flanged or butt-welding ends in full port or venturi type. Size range is two through 30 inches. They are recommended for service on crude oil, finished product and gas lines, with suitable trim being furnished for the service.

Stamford, Conn., research laboratories of American Cyanamid Co., recently held open house for the first time. One exhibit dealt with chemical additives for lubricating oils. A comprehensive display of the actual chemicals, their uses and the equipment in which they are tested was shown. Another exhibit featured cracking catalysts.

Purchases Interest in Atlas Pipe

Alvin (Dutch) Zwerneman, who recently resigned as vice president and general sales manager of the Axelson Manufacturing Co., Los Angeles, has purchased an interest in Atlas Pipe, Inc., of Houston, Texas. In addition to the sale of petroleum pipe, the Atlas organization will represent the Rasmussen Manufacturing Co., Hollydale, Calif.; the E. H. Edwards Co. of San Francisco; and Page Oil Tools Inc. of Long Beach.

Industrial Finishes

Shell Chemicals Limited demonstrated the important role now being played by the chemicals-from-petroleum industry in the production of surface finishes at the recent Industrial Finishes Exhibition. The stand was largely decorated with finishes in the manufacture of which Shell chemical products have been employed, and there were a number of panels coated with lacquers made with Shell ketones.

BOOKS

ELEMENTS OF OIL RESERVOIR ENGINEERING—Sylvain J. Pirson	$ 6.50
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GEOPHYSICAL CASE HISTORIES Vol. I—Society of Exploration Geophysicists	$ 7.00
HANDBOOK BUTANE PROPANE GASES—Butane Propane News	$ 5.00
HANDBOOK FOR CHEMICAL ENGINEERING—Donald M. Liddell	$ 8.00
INCREASING THE RECOVERY OF PETROLEUM—Vol. I & II	$10.00
LUBRICATING GREASES: Their Mfg. and Use—E. N. Klemgard	$16.50
MACHINERY'S HANDBOOK—Erik Overg & F. D. Jones	$ 7.00
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PETROLEUM REGISTER (International Petroleum Register) 28th Edition, 1950	$15.00

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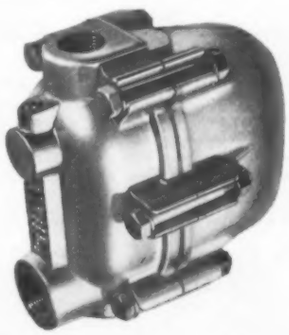

Somewhat unusual in steam trapping

It may seem unusual to find a single firm making nearly 180 separate standard patterns of steam traps to meet the widest needs of industry.

Even more unusual, perhaps, to find that such a firm doesn't after all sell steam traps (like so much hardware) but good steam trapping methods.

And one might feel it is something quite off the beaten track to find that same firm concerning itself almost wholly and solely with methods of improving heat transfer from steam, of which good steam trapping methods are an essential part.

Thus the services to the oil industries from this single source include: (A) advice on any steam-heat transfer problem; (B) condensate drainage equipment (steam traps, pipelire strainers, sight glasses) for every requirement from vacuum up to 275 psi; (C) automatic air venting equipment for steam or water or oil lines and plant; (D) steam separators for *individual* steam drying at the inlets to steam units; (E) flash steam and condensate recovery equipment (including automatic pumping and lifting from vacuum and low pressure); (F) indicating steam metering equipment for departmental readings.

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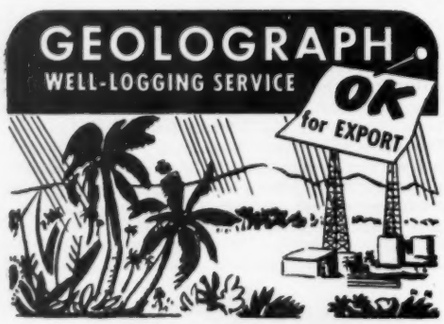

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Principles and procedures of forecasting oil and gas reservoir performance

This comprehensive technical reference presents the principles governing the behavior of petroleum reservoirs under production. It shows their application in studies made for the purpose of predicting ultimate recovery from oil and gas reservoirs and prescribing the most effective production controls to effect maximum recovery. The numerous factors of reservoir structure, drive mechanisms, etc. with which the reservoir engineer deals, also the techniques and equations for their analysis, are fully covered to give a well-rounded picture of this important tool of oil conservation.

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ELEMENTS OF
OIL RESERVOIR ENGINEERING
By Sylvain J. Pirson, Special Research Associate, Stanolind Oil and Gas Company
441 pages, 6x9, 225 illustrations, $6.50

Here are all the elements of reservoir engineering, taken up in logical order for full understanding and application, and with many features of treatment to represent best development to which practices in this field have been brought.

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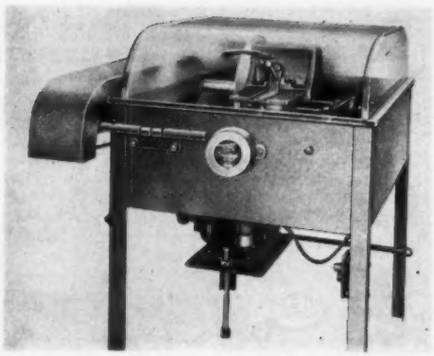


New core slicing machine.

Diamond Core Saw

Highland Park Manufacturing Co., South Pasadena, Calif., has developed a new fast-action core slicing machine for petroleum production laboratories. The device was built in close cooperation with core analysis technicians to serve a variety of uses for core work. The outstanding use is sawing thin sections from cores for microscopic study. Uniform, parallel thin-sections can be made and held to tolerances of .002 inch. It is capable of handling cores up to 6.5 inches in diameter.

To Modernize Ponca City Plant

Cities Service Oil Co. (Del.) will modernize its Ponca City, Okla., refinery by the installation of catalytic cracking and polymerization facilities and auxiliary equipment. The present crude unit will be revamped to increase its capacity a third to 20,000 barrels daily. It will be operated in conjunction with a vacuum flashing unit to provide feed stock for the fluid unit. Present thermal cracker will be shut down. A new water cooling tower will be built, steam and water capacity increased and new storage built. M. W. Kellogg Co. is designing the project.

Du Pont Increases Tel Capacity

The petroleum chemicals division of the Du Pont Company announced that expanded facilities for manufacturing its tetraethyl lead antiknock compounds for gasoline will be in production before the end of the year. The new manufacturing units which are now approaching completion at the company's Chambers works, Deepwater Point, N. J., will raise its capacity for making tetraethyl lead by one-third.

Construction of the new equipment originally was started to make it possible for the company to meet normal expansion of its tetraethyl lead business. This program was considerably accelerated because of the Korean war.

New Hydraulic Drive

The Twin Disc Clutch Co., Racine, Wis., has developed a new type of hydraulic drive which "dumps" the hydraulic fluid in from one to four seconds, when desired to serve as its own master clutch and provide a complete disconnect between the prime mover and load on such applications as drawworks, slush pumps and some types of engine compound drives. With the exception of provisions for the disconnecting feature, the new unit is similar to other Twin Disc double-circuit hydraulic couplings.

Westoil Buys Pacific States Refinery

Westoil Terminals Co. has purchased the physical assets of the Pacific States Oil Co. The property located in the Los Angeles harbor area consists of fifty million gallons of bulk storage and a 30,000-barrel refinery. Arrangements have been made for the use of marine terminal facilities at Berth 120, San Pedro. Westoil Terminals Co. is a newly-formed operating company, organized by a group headed by C. Edward Miller of Los Angeles, independent petroleum marketer who recently resigned as chairman of Time Oil Co.

Gas Line Contracts

Major construction contracts have been awarded for the 1,331-mile, 30-inch natural gas pipeline which Texas Illinois Natural Gas Pipeline Co. of Chicago is building from the lower Texas Gulf coast area to the Chicago metropolitan region. Midwestern Constructors, H. C. Price Co. and the Bechtel Corp. will build the pipeline, most of which will be of 30-inch diameter steel pipe, while Fish Pipeline Construction Corp. will build the system's compressor stations.

New Rocky Mountain Line

To provide a greater outlet for Rocky Mountain crude than is now provided by local markets, five producing companies in the area have combined to organize the Platte Pipe Line Co. which will build a $60 million line from Worland, Wyo., to Wood River, Ill. The line will consist of 140 miles of 16-inch and 940 miles of 20-inch pipe. It will connect with nearly all existing Wyoming lines. Because of the 4,500-foot difference in elevation between Casper and Wood River, only two pump stations will be required to deliver about 70,000 barrels of oil daily. Additional stations could increase the line capacity to 150,000 barrels daily. Rocky Mountain crude reserves recently were estimated at 1,690 million barrels.

Present participants in the project are British-American Oil Co. Ltd., Continental Oil Co., Pure Oil Co. and Sinclair Refining Co., each of which has producing properties in the mountain area. H. L. Phillips, president of Sinclair Oil & Gas Co., is president of Platte Pipe Line Co.

New Gasoline Dye

A new blue dye for aviation gasoline has been developed by E. I. du Pont de Nemours & Co. The new dye is 35 percent stronger and several times more soluble than the previous dye and hence will minimize the formation of deposits in superchargers.

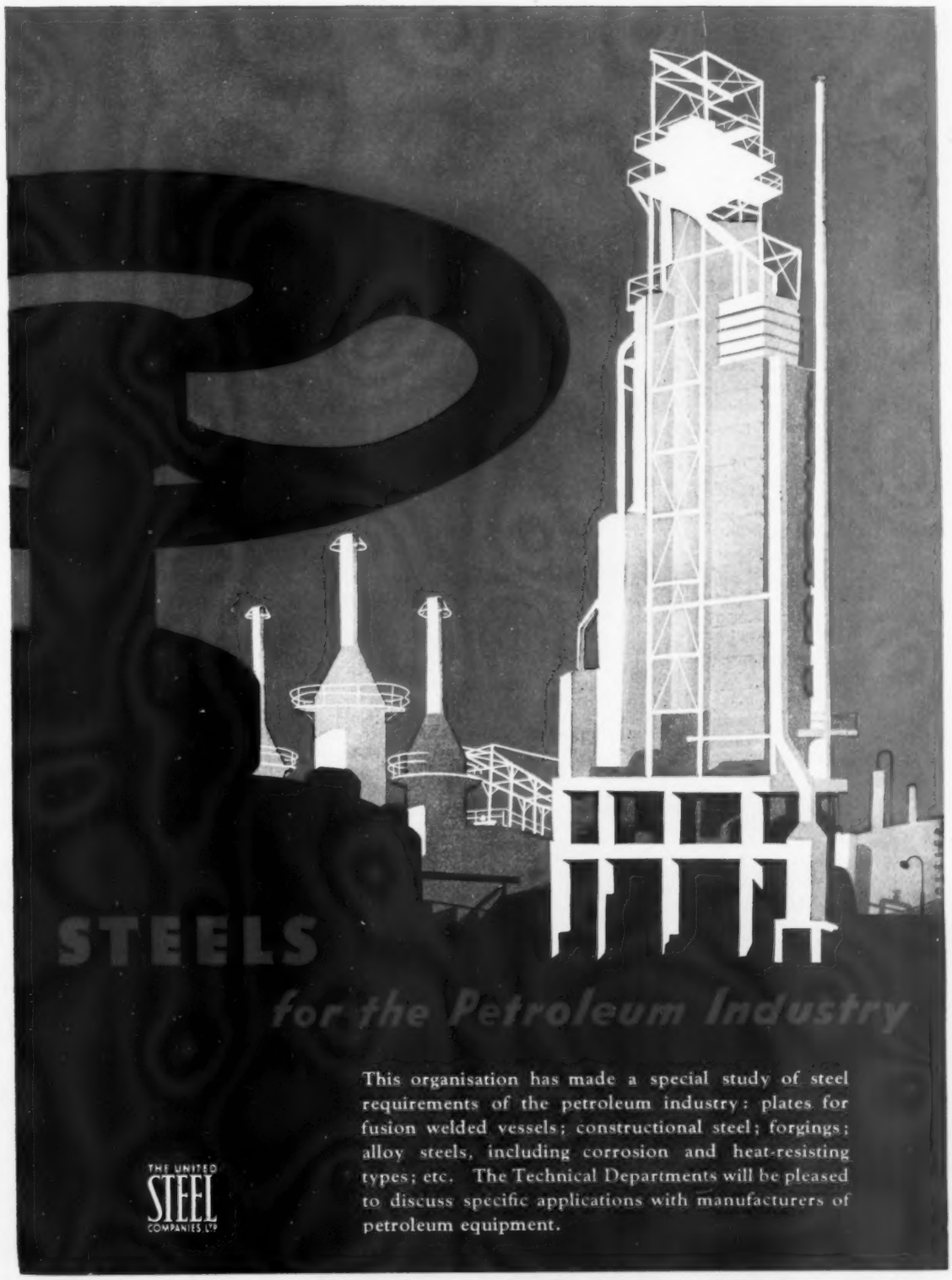
Continental Research Building

Continental Oil Co. will build a $2,250,000 research laboratory building in Ponca City, Okla., to house both production and refining research activities. The new building will be a three-story structure connected to Continental's newest office building and will contain almost 40,000 square feet of floor space, giving the company a total of more than 85,000 square feet of laboratory space.

Heavy Duty Trucks

A new line of heavy-duty diesel-powered trucks and truck-tractors is now in production by International Harvester. The new LD-300 series includes both four and six-wheel vehicles for on and off-highway operation, with cross combination weights up to 200,000 pounds and an optional group of six engines ranging from 165 to 300 hp. Four, five and ten speed transmissions are optional in the new line. The ten-speed transmission represents a new development featuring single-lever operation. Auxiliary transmission and two-speed axles are available.

International Harvester truck.


STEELS
for the Petroleum Industry
This organisation has made a special study of steel requirements of the petroleum industry: plates for fusion welded vessels; constructional steel; forgings; alloy steels, including corrosion and heat-resisting types; etc. The Technical Departments will be pleased to discuss specific applications with manufacturers of petroleum equipment.
THE UNITED STEEL COMPANIES LTD

THE UNITED STEEL COMPANIES LIMITED OF SHEFFIELD ENGLAND

THE LARGEST STEEL PRODUCERS IN THE BRITISH COMMONWEALTH

(RD) US 38

Government Moves Toward Industrial Mobilization

(Continued from page 32)

Although the decision to leave industry affairs and regulations mainly in the hands of existing departments rather than setting up special agencies is in line with the administration policy of minimizing the importance of the Korean embroilment and its effect on the economic life of the nation, this may lead to confusion and conflict between bureaus if the situation takes a more serious turn. In the case of petroleum, for example, while Secretary of Interior Chapman is to have general supervision, he is reported to be against the recommendation of the National Petroleum Council for an integrated organization manned by experienced members of the oil industry to see that government objectives are realized. Instead, he is said to plan on setting up a Minerals Energy Administration within his department to handle coal, oil, gas and power, this to be headed by a man unconnected with any of these industries but one who is "impartial."

Among other agencies involved are the National Planning Authority in the Department of Commerce, which will determine the allotment of critical materials to various needs and will exercise control over exports; the handling of tankers, which is under the Maritime Commission, also in Commerce; the direction of land and internal waterway transportation, which is the function of the independent Interstate Commerce Commission; the stockpiling of materials and the establishment of additional industrial facilities, a broad authorization placed in the hands of the General Services Administration. Voluntary agreements as to production and distribution must have the advance blessing of the Federal Trade Commission and approval of the Department of Justice, while the Federal Power Commission has the say-so in regard to permits for pipeline construction.

A new independent Economic Stabilization Agency has been created to "establish price ceilings and stabilize wages and salaries wherever necessary." Other matters such as rationing or government loans to promote production useful to national defense have not been definitely assigned as yet.

Over all this maze of governmental bureaus is the top umpire, national coordinator W. Stuart Symington, whose task is to adjust claims, settle disputes and weld the many separate groups into a smooth running and efficient organization. Who envies Mr. Symington?

Colombia Increases Production

Production of crude oil in Colombia set a new record in the month of July with an average output of 100,314 barrels daily. This compares with a daily record of 83,321 barrels in 1949 and 67,653 in 1948. Preliminary figures of the Ministry of Petroleum indicate an output of 94,700 barrels daily in August plus 2,000 barrels of condensate.

R. Chris Nitschke

Rockwell Adds Project Engineer

R. Chris Nitschke has joined Rockwell Manufacturing Co. as a project engineer on petroleum products. Mr. Nitschke is no newcomer to petroleum products and equipment, having been formerly employed by Standard Vacuum Oil Co. as assistant chief engineer. He spent 1946 in South America as a project engineer for M. W. Kellogg.

Heads Arthur G. McKee Sales

Myran J. Livingston has been appointed sales manager of the petroleum refining division of Arthur G. McKee & Company. He will be located at the company's headquarters in Cleveland, Ohio. For the past six years Mr. Livingston has been in charge of the company's sales office in New York. Jerry Brennan, who recently became associated with the company as a sales engineer, will be in charge of the New York office. Mr. Brennan formerly had been the New York representative of Sivyer Steel Castings Company.

Steiniger Heads Venezuelan Petroleum

E. L. Steiniger has been made president of Venezuelan Petroleum Company and of its operating subsidiary, Sinclair Oil and Refining Company. H. R. Kunhardt Jr., former president, has been granted leave of absence. Mr. Steiniger has been the active representative of Sinclair in Venezuela for a number of years and held the post of executive vice president. This position is now held by E. J. Mulvihill Jr., former vice president. W. C. Paton, who has been district manager in the Santa Barbara field, has been transferred to the Caracas office as vice president and assistant to Mr. Mulvihill in charge of operations.

E. L. Steiniger

Oil Aid to Europe Reflected in Recovery

(Continued from page 46)

tiplied two and a half times, and consumption has increased 23 percent.

In the overall planning of the European program based largely on calculations prepared by the Organization for European Economic Cooperation (OEEC), refining capacity recommended for 1950 was 800,000 barrels daily, and the program is about on schedule. OEEC anticipates a continuing growth of nine to ten percent annually in consumption for the next few years, which would support a refining capacity in 1953 of about 1,300,000 barrels daily. ECA has looked upon this figure as overoptimistic, but current developments indicate that it may not prove excessive.

Irrespective of the future course of events, it is estimated that European countries are saving $40 million a year through the refinery program. That is, as Dr. Oscar Bransky puts it, if the refinery capacity was the same as two years ago, Europe would have to spend an extra $40 million a year to get its petroleum products.

Since the tabulation accompanying this article was compiled, ECA has authorized an additional $48.7 million in dollars and dollar equivalents for new construction. These authorizations include the new Dunkirk refinery in France, replacing one destroyed during the war, and a new plant at Lingen, Germany. The former is being built by Soc. Gen. des Huiles de Petrole and will have a daily crude capacity of 28,000 barrels; the latter will be constructed by Gewerkschaft Erdoel Raffinerie Elmsland, and will have a capacity of 12,000 barrels daily. A grant additional to one made last year to the SIRO refinery at Porto Marghera, Italy, will increase its capacity by 4,000 barrels daily.

Although top command of ECA's petroleum division is changing hands, no change in the petroleum program is foreseen. Harvey W. Daniels, for 34 years an employee of the Standard-Vacuum Co. in the Far East and elsewhere, becomes the third ECA petroleum division director. Dr. Bransky is being transferred to Paris as petroleum chief in ECA's Office of Special Representative.

B-J Names Houston Manager

William S. Thomas has been appointed manager of the Houston office of the Pump Division of Bryon Jackson Co., transferring from a similar position at the San Francisco office. Mr. Thomas is a graduate of the University of California and of the Harvard School of Business. He started with Bryon Jackson Co. in July 1941 and was made production manager of submersible motors production in 1944, later becoming a sales manager at San Francisco for the past four years, handling pump sales in the northwestern states.

Sir Hubert Heath Eves

The article in the September number of World Petroleum relating to the retirement of Sir Hubert B. Heath Eves from the post of deputy chairman of Anglo-Iranian Oil Company Ltd. after forty years of service failed to make clear that the relinquishment of office applied only to the deputy chairmanship. Sir Hubert retains his position on the company's board where his long experience and seasoned advice makes him a most valued member.

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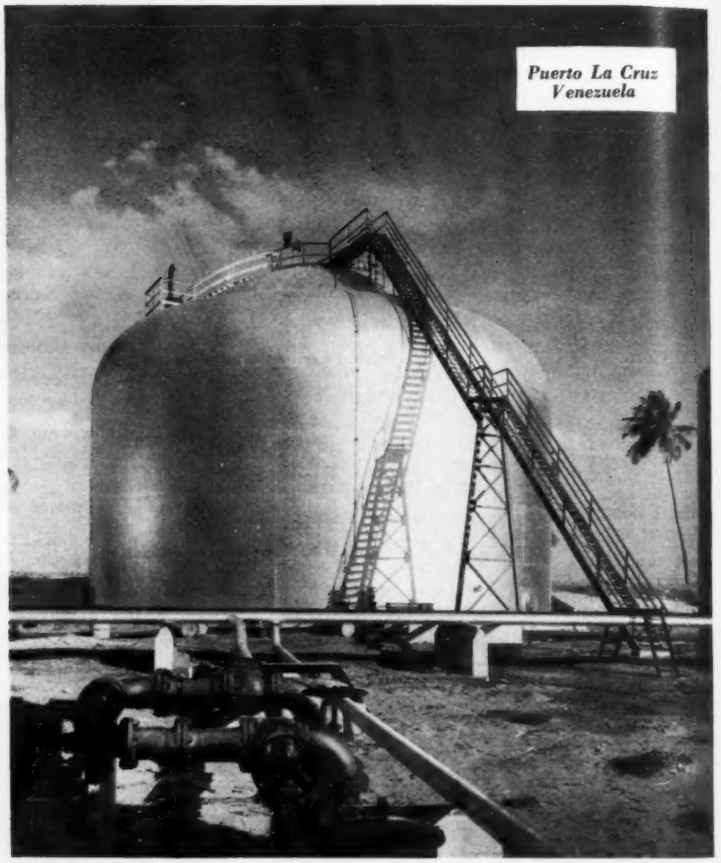

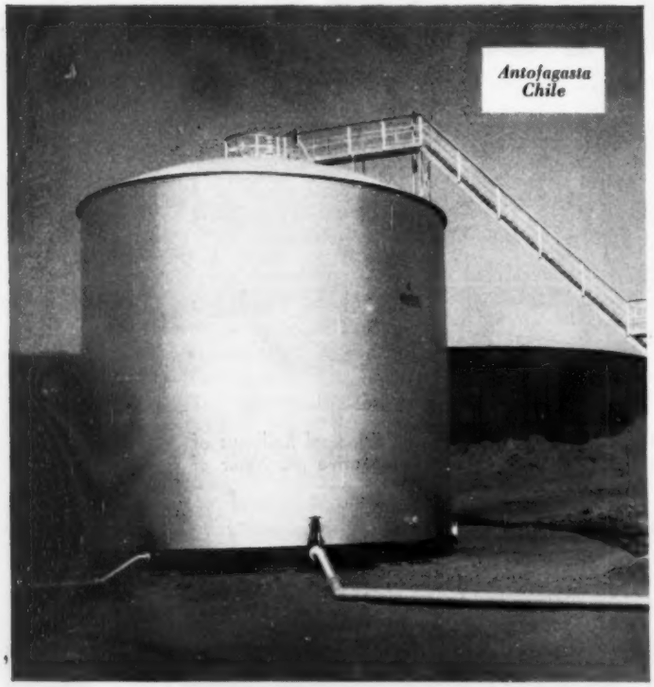

There are two features about the Horton* Hemispheroid that add up to *less evaporation loss* during standing storage of gasoline and other volatile liquids requiring storage pressures up to 5 lbs. per sq. in.

First, it is designed to withstand the internal pressure resulting from normal temperature variations. No venting will take place as long as this internal pressure does not exceed the relief valve setting. Second, the internal pressure is independent of the liquid level in the tank. This means that the Hemispheroid is just as efficient nearly empty as it is when almost full. It is therefore well suited for use at bulk stations or marketing terminals where containers are filled and emptied only a few times per year.

The cylindrical shell is a large portion of the Hemispheroid. It is relatively easy to fabricate and erect cylindrical tanks and therefore the Hemispheroid offers *lower first cost.*

Bulletin E tells you how to select a Hemispheroid with the proper capacity and working pressure for your requirements. Write the nearest office for a copy.

Horton*Hemispheroids are available in two designs, *noded* and *plain.* The *noded* Hemispheroid shown above is located at the Creole Petroleum Company's Los Cocos Terminal in Puerto La Cruz, Venezuela. This design is available in capacities from 10,000 to 30,000 bbls. for a pressure of 2½ lbs. per sq. in. The *plain* Hemispheroid shown at the left is used to store aviation gasoline at the Antofagasta, Chile, marketing terminal of the Esso Standard Oil Co. (Chile) S.A.C. This design is available in capacities from 2,000 to 20,000 for a pressure of 2½ lbs. and up to 7,500 bbls. for a pressure of 5 lbs. per sq. in.

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The Hughes men visit more rigs more times. That is the reason Hughes knowledge of special drilling conditions and rock-bit development in the field leads all competitors. This knowledge is available to you, of course, at any time. We invite you to make use of it.

if he could look back HE'D BE PROUD . . .

Wyatt 225-gallon galvanized corrugated wagon tank. It took two horses to pull it.

Thirty-seven years ago W. J. Wyatt fashioned storage and wagon tanks from galvanized iron in a small shop at Dallas. Truly he was a pioneer industrialist in his line. With a few ambitious workers, a few shop tools and some good ideas he laid plans for bigger things.

Today many hundreds of skilled craftsmen in Wyatt's Houston and Dallas plants are fabricating those bigger things. Backed by all that modern science offers in machines and methods, they are turning out huge vessels as shown below and all the other massive and complex steel plate fabrications found in the petroleum, chemical and other heavy industries today.

Wyatt 220-ton fractionating tower. It took three railroad cars to haul it.

Wyatt's

HOUSTON-DALLAS-NEW YORK-TULSA